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Volume 35 No. 8 AUGUST 1948

Plating

THE MONTHLY REVIEW OF THE AMERICAN ELECTROPLATERS' SOCIETY

In this issue:

Ventilation in the Production Department

Purification of a Small Watts Type Nickel Plating Bath

etal Finishing Training at the Rochester Institute of Technology

Brushes in the Finishing Industry

Electroplating of Roller Chains

Convention Notes and Pictures

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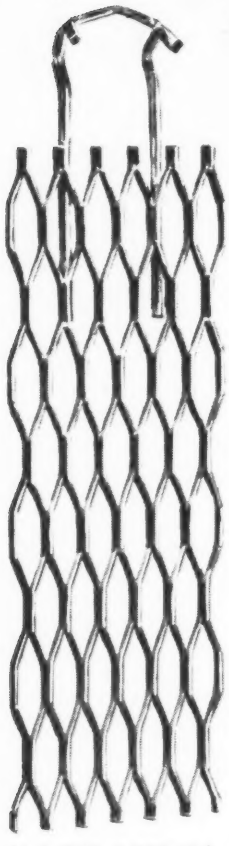
CLEPANODES

TO SPEED ACTION AND IMPROVE EFFICIENCY OF ELECTROCLEANERS



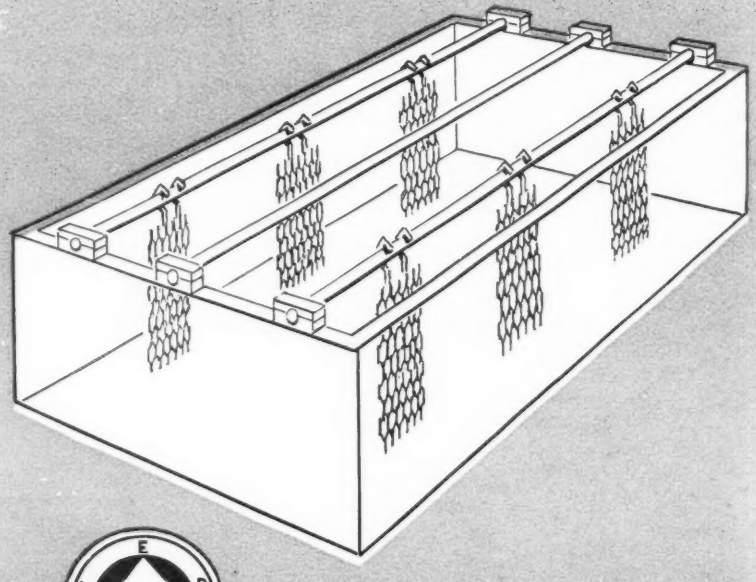
U.S. PAT. 2 275.194

The Clepanodes are made of Steel with Bronze Hooks. The design is of a special patented nature which gives improved current carrying capacity and increased gas dislodgement action.

The result is that more mechanical gas scrubbing action is obtained on the work being electrocleaned. Therefore the work will electroclean much faster and much more uniformly.

These Clepanodes are ideal for use in Electrocleaners prior to Bright Nickel Plating, Cadmium, Zinc, Brass, etc.

Install Clepanodes immediately in your Electrocleaning tanks.



CLEPANODES ARE AVAILABLE IN TWO SIZES

① 24" Grill + 4" Hook = 28" overall height, Total Net W. 12 lbs.

② 32" Grill + 4" Hook = 36" overall height, Total Net W. 16 lbs.

All Clepanodes are 8" overall in width.

CLEPANODES CLEANING COMPOUNDS

FREDERICK GUMM Chemical Company Inc.

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do you know about these new developments?

write for new bulletins

ENTHONE

PRODUCTS OF METAL FINISHING RESEARCH

Finishing Processes

ALUMON–A simple process for preparing aluminum for electroplating with nickel, chromium and other metals.

ALUMOX–A process for chemically oxidizing aluminum to impart protection to corrosive atmospheres and prepare it for organic finishing.

EBONOL "C"–A process for chemically oxidizing and blackening copper and copper alloys. The finish is also a good base for painting.

EBONOL "S"–A chemical process for blackening iron and steel operated in the temperature range from 285 290 F

EBONOL "Z"–A process for blackening zinc and zinc alloys.

Products for Metal Surface Preparation

ACID ADDITION AGENT – A surface active material which is added to hydrochloric and sulphuric acid pickles to prevent fuming, to inhibit attack upon the steel and promote better pickling.

ACTANE – An additive for pickling solutions to enable removal of colloidal films left on metal during cleaning. Insures bright nickel plating.

INHIBITOR 9 – A new clean, non-odorous complete inhibitor for mineral acids – hydrochloric, sulphuric, phosphoric. Insures bright pickling of steel without attack.

SURPREP–A phosphoric acid-solvent type oxide remover and cleaner Prepares aluminum, zinc and steel for painting.

EMULSION CLEANER 75–An emulsifiable solvent of high detergency, safe for the plating room A powerful cleaner for all metals to prepare them for plating, painting or phosphate treatments

Products for Better Finishing

BRASS ACTIVATOR – Material for preparing copper, brass, and copper alloys for organic finishing. Also used for treating brass prior to blackening.

BLENDALL – A flow-out agent for nitrocellulose lacquers to give high gloss and reduce orange peel. Also acts as a retarder to prevent blushing.

WATER DISPLACING LIQUIDS – Watershedding organic liquids for drying plated work rapidly without staining.

COMPOUND NR37–An organic material which is added to hot water used for drying after pickling to prevent rusting or yellow staining of steel. No film is left upon the work to interfere with organic finishing.

ENAMEL STRIPPERS–Various solvent and emulsion type strippers are available for rapidly removing enamels, lacquers and other organic coatings from all metals without attack.

WAX EMULSIONS – Water emulsions of waxes for protecting metals against corrosion. Clear glossy and black waxes are available.

Metal Cleaners Products of Surface Chemistry

ALUMINUM CLEANER E – An etching type cleaner for cleaning aluminum as well as etching.

ALUMINUM CLEANER NE–A powerful cleaner for cleaning aluminum without any attack or tarnish.

BRASS CLEANER–A powerful cleaner but has a mild action on brass, nickel-silver, lead-tin alloys, steel and other metals.

CLEANER 100–An alkali cleaner of very high detergency for cleaning steel by soaking or electrolytic means.

ZINC CLEANER 20 – An electrolytic cleaner for degreasing zinc base die castings to secure adherent deposits of copper and nickel.

ENTHONE INC., 442 ELM ST., NEW HAVEN, CONN.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 538.

Industry News

Instrument Courses. The Foxboro Company, which has conducted training courses in the theory, application, operation and maintenance of industrial instruments since early in 1935, has announced its schedule for the remainder of 1948. There will be five courses, each of two weeks' duration, in the months of July, August, October, November and December. Courses will also be arranged for companies wishing to send a group sufficiently large to warrant a special class for the study of particular instruments and applications. Special courses will also be arranged for specific industry groups. Similar facilities are offered by The Foxboro Company, Limited, in Montreal, for the benefit of Canadian industry.

Enrollment is by application, forms for which are available through all the branch offices or from the home office of the company at Foxboro, Mass. Address the Director of Training Courses.

Underground Corrosion Exhibit. In connection with comparative field tests of the corrosion resistance of various pipe materials in different types of soils, the National Bureau of Standards has announced an exhibit of approximately 3,000 actual test specimens. Chemists, metallurgists, corrosion engineers, and others interested in the behavior of materials underground are invited to inspect the test samples, which will be on display until August 15, 1948, in the Bureau's Underground Corrosion Laboratory, Connecticut Avenue and Van Ness Street, N. W., Washington, D. C.

The specimens were exposed at 15 test sites throughout the United States for periods ranging from five to fourteen years. They consist of 85 varieties of materials, including seven types of wrought iron and wrought alloys, 17 types of cast iron and cast alloys, 22 types of steel and steel alloys, 13 types of copper and copper alloys, and miscellaneous samples of lead, zinc, metallic- and nonmetallic-coated pipe, and asbestos-cement pipe. Measurements of loss of weight and depth of pitting of the specimens have been made, and a report on the corrosion resistance shown by the materials studied is in preparation.

American Society for Testing Materials, at its Fifty-first Annual Meeting in Detroit during the week of June 21, announced the election of the following officers for the year 1948–1949:

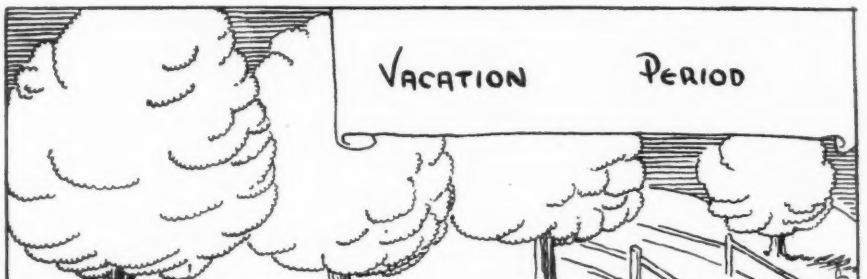
President—RICHARD L. TEMPLIN, Assistant Director of Research and Chief Engineer of Tests, Aluminum Company of America, New Kensington, Pa.

Vice-President (2-year term)—L. J. MARKWARDT, Assistant Director, U. S. Forest Products Laboratory, Madison, Wisc.

Members of Board of Directors (3-year terms)—LESLIE C. BEARD, JR., Chemist and Assistant Director of Laboratories, Socony-Vacuum Oil Company, Inc., New York City; SIMON COLLIER, Director of Quality, Johns-Manville Corporation, New York City; THEODORE P. DRESSER, JR., Chief Engineer, Abbot A. Hanks, Inc., Los Angeles, Calif.; HOWARD K. NASON, Associate Director, Central Research Department, Monsanto Chemical Company, Dayton, Ohio; EDGAR W. FASIG, General Superintendent, Lowe Brothers Company, Dayton, Ohio.

Non-Inflammable Paint Case Decided. The United States District Court at Wheeling, W. Va., has entered judgment for the plaintiffs in a patent infringement suit based on McCulloch Patent No. 2,044,176 for Non-Inflammable Paint, holding the patent valid and infringed. The plaintiffs were William E. Hopper & Sons Company of Baltimore, owners of the patent, and The Watson-Standard Company and Plicote, Inc., of Pittsburgh, exclusive licensees. The defendant was Blue Ribbon Paint Company of Wheeling, W. Va., and the product charged to infringe was Treesdale Flame Retardant Paint containing antimony trioxide and a chlorinated carrier.

The Court's final judgment order notes that in a pretrial deposition it had been admitted that the conduct of the defense was carried by Treesdale Laboratories, Inc., of Pittsburgh. When the case was



Industry News

called for trial, on May 24, the attorneys for both Treesdale and Blue Ribbon announced that they would not defend the case further. The Court held in its final judgment order that Treesdale was "A privy to this cause and to this final judgment."

Fourth Annual Cleveland Symposium, sponsored jointly by the Cleveland sections of American Chemical Society, American Institute of Chemical Engineers Electrochemical Society, will be held on September 25 in Hotel Carter, Cleveland, Ohio. The symposium subject is *Surface Chemistry* in its various aspects. The program has been definitely confirmed and will include the following:

MORNING SESSION—10:00 A. M.

"Crystal Structure and Surface Behavior" by Dr. A. T. Gwathmey, University of Virginia

"Developments and Trends in Industrial Catalysts" by Dr. J. H. Boyd, Consultant

"Surface Reactions of Magnesium as an Anodic Material" by Mr. W. S. Loose, Director, Laboratory Development Division, Magnesium Laboratories, Dow Chemical Company

LUNCHEON

AFTERNOON SESSION—2:00 P. M.

"Phosphate Coating of Metal" by Mr. V. M. Darsey, President, Parker Rust Proof Company

"Principles of Powder Metallurgy" by Mr. H. C. Miller, Vice-President, Charles Hardy, Inc.

"New Developments in Organosols and Plastisols" by Mr. C. W. Patten, Manager, Coating and Adhesive Materials Division, Thermoplastics Department, The Bakelite Corporation

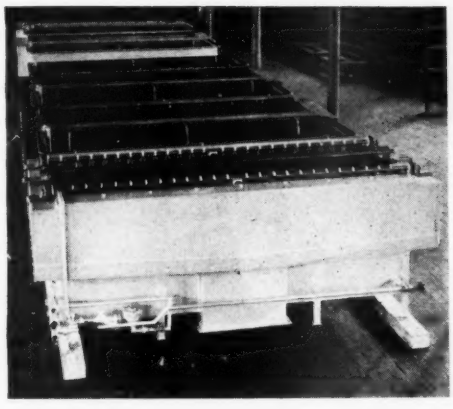
Inquiries should be addressed to the Chairman, K. S. Willson, The Harshaw Chemical Company, 1945 East 97th Street, Cleveland 6, Ohio.

Plating Chemicals Increase in Price. The rising cost of raw materials, production, and shipping has made necessary an increase in the prices of cyanide compounds, trichloroethylene, and hydrogen and sodium peroxides, according to the du Pont Company.

The increases, effective July 1, were the first in the base prices of cyanide compounds and these peroxides since 1918. Sodium cyanide went up one cent

Published monthly at 5800 N. Mervine St., Philadelphia 41, Pa. Entered as second class matter July 1, 1946, at the Post Office at Philadelphia, Pa., under Act of August 24, 1916. Copyright, 1948, by the American Electroplaters' Society, Inc. Subscriptions: Domestic and Canada, $4.00 per year, 50c per copy; Foreign, $6.00 per year, 75c per copy.

Tanks can be inert, too



THEY *should* be inert—chemically inert to the cleaning, rinsing or plating solutions which they contain. For longer life, they should not be affected by their liquid contents. For better finishes, they should not contaminate the solutions. Engineered inertia, each tank designed for its special function in the cycle, has long been a Storts specialty.

Plan your tank cycles this modern way—and save!

The Stortswelded tank cycles illustrated here embody the security and safety that derive from wise selection of materials and sound fabrication practice. In addition, they have other refinements of design that improve general operating conditions.

All along the line in plating and cleaning cycles, Storts engineering service can help you to keep production moving, to reduce maintenance and replacement costs and to compensate for special conditions in your processing. Your inquiries on single tanks, replacements or complete new installations are invited.

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Where long life is desired . . . where top efficiency is demanded . . . where minimum maintenance is a factor, use a Motor-Generator. Continuous duty for over twenty years is common for an E.P. machine. Its life-time efficiency of 75% or better amortizes the complete investment from the savings in electricity alone.

Maintenance is reduced to the absolute minimum. Installation cost is negligible. Expensive forced-draft ventilating is not required with an E.P. Motor-Generator . . . nor special high-cost vaults. Thirty-four years of operating experience prove that E.P. Motor-Generators give economies of operation unmatched by any other source of direct current.

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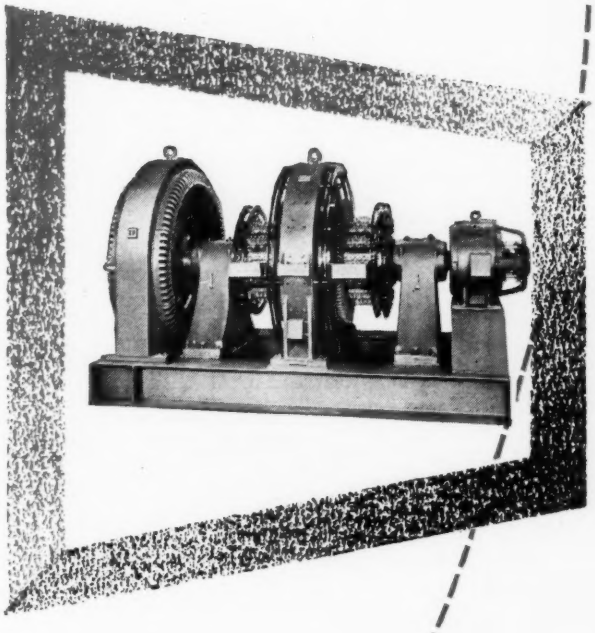

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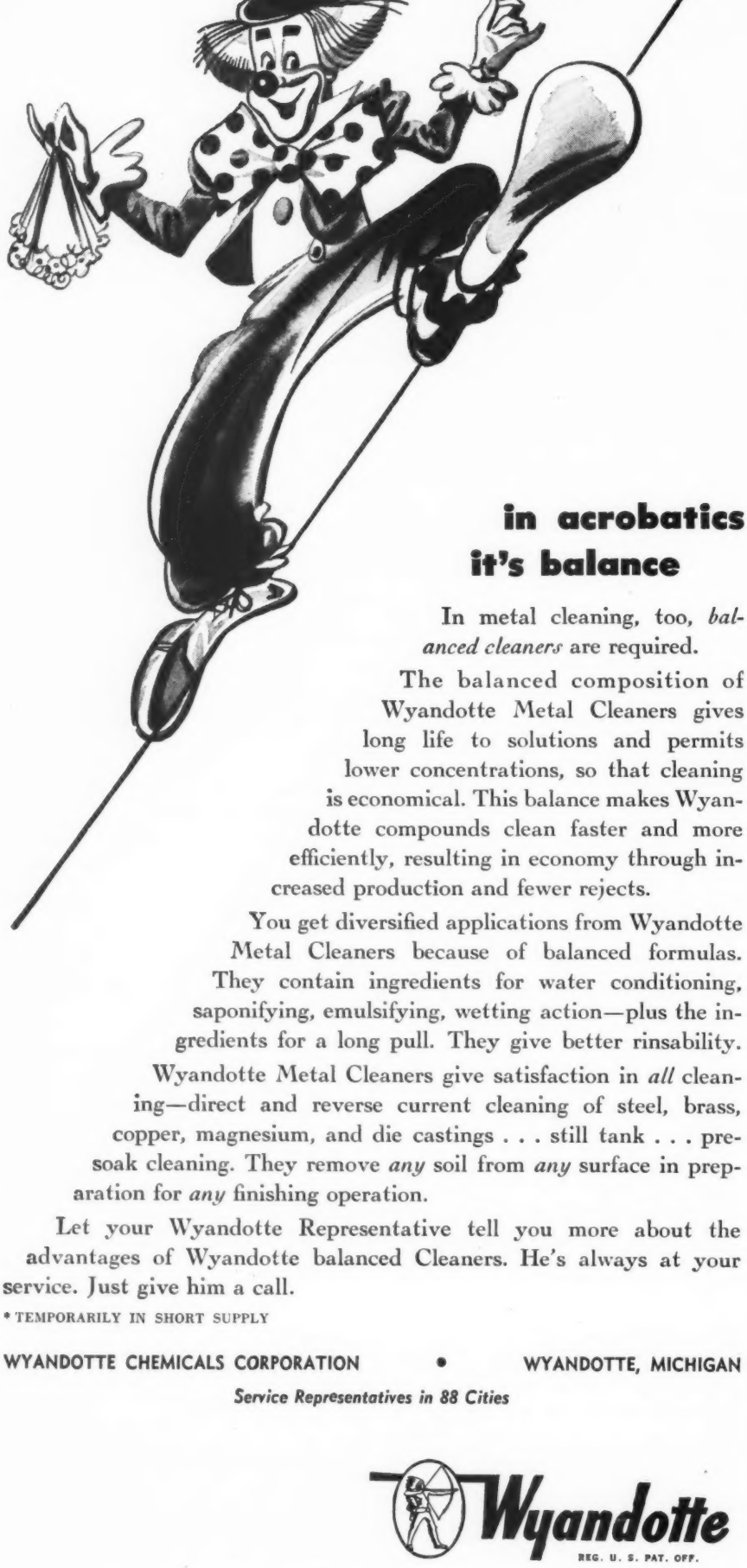

in acrobatics it's balance

In metal cleaning, too, *balanced cleaners* are required.

The balanced composition of Wyandotte Metal Cleaners gives long life to solutions and permits lower concentrations, so that cleaning is economical. This balance makes Wyandotte compounds clean faster and more efficiently, resulting in economy through increased production and fewer rejects.

You get diversified applications from Wyandotte Metal Cleaners because of balanced formulas. They contain ingredients for water conditioning, saponifying, emulsifying, wetting action—plus the ingredients for a long pull. They give better rinsability.

Wyandotte Metal Cleaners give satisfaction in *all* cleaning—direct and reverse current cleaning of steel, brass, copper, magnesium, and die castings . . . still tank . . . presoak cleaning. They remove *any* soil from *any* surface in preparation for *any* finishing operation.

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Industry News

a pound to 14 cents. Other cyanide compounds increased proportionately. Trichloroethylene rose one-half cent a pound to 10½ cents. Sodium peroxide climbed two cents a pound to 16 cents, and 35 per cent hydrogen peroxide one cent to 20½ cents.

Fifty-First Annual A.S.T.M. Meeting. With more than 135 technical papers and reports of the Society's committee, some 360 committee meetings, and an extensive exhibit of testing and research apparatus and laboratory equipment, the Fifty-first Annual Meeting of the American Society for Testing Materials on June 21–25 in Detroit again emphasized the importance of work in materials. Total registration for the week was something over 1,775.

The field of corrosion, in which the Society has taken a leading part with several committees active, included discussion of factors of importance in atmospheric testing of low-alloy steels, discussion of laboratory corrosion tests of iron and steel pipes, and an interesting study of organic coatings used to prevent corrosion-fatigue failures.

As a result of recommendations by the Society's committees which are responsible for initiating and carrying through work on specifications and tests for materials, there were 52 tentative specifications and tests approved and about 70 existing tentatives are to be adopted as standard subject to Society letter ballot.

Of interest to the metallurgist was the Symposium on Metallography in Color with latest developments covered in several papers. It is hoped these will be published later in the year.

The Symposium on Magnetic Testing in two sessions with nine papers brought up to date the art and science in this field. The symposium described some of the problems encountered and the methods that are used to overcome them.

CORRECTION

By an oversight, the name of one of the valued sustaining members of the Society, American Chemical Paint Company, Ambler, Pa., was omitted from the Sustaining Membership list printed in the June issue.

SALESMAN WANTED

Nationally known manufacturer has opening for a man with a thorough knowledge of polishing and buffing equipment, wheels, compositions, etc. Previous sales experience desirable. Must be free to travel. State age, experience, and salary expected. *Reply to:*

P-8A, PLATING
P. O. Box 168, Jenkintown, Pa.

Personals

J. C. McKenna has been appointed manager of chromium chemical sales of the Diamond Alkali Company. Associated with Diamond for the past twenty-six years, he will have charge of selling close to a third of the nation's total supply of chromium chemicals. Sale of these products through Prior Chemical Corporation of New York has been discontinued, in line with Diamond's policy of selling its primary chemical products directly through the company's branch sales offices and chemical merchants strategically located in principal industrial centers. Although construction is under way to increase the output of sodium bichromate within twelve months, it is improbable that additional commitments can be made this year for Diamond's chromium chemicals.

Sternal

L. S. Sternal joins the Jackson Buff Corporation, Long Island City, N. Y., as Sales Manager. His duties will include building a national sales force to service adequately the demand for the company's products. Mr. Sternal graduated from Carleton College, Minnesota. He later joined General Electric Company in Schenectady and Bridgeport. Prior to the war, he was a Sales Engineer for Minnesota Mining and Manufacturing Company, New York Branch. After serving three years in the Navy as an officer on the staff of a destroyer squadron commander, he rejoined Minnesota Mining as Methods Engineer in which position he gained wide experience developing new usages and applications in the polishing industry.

H. Donald Douglas has recently joined the research staff of Graham, Crowley & Associates, Inc. Mr. Douglas, who graduated from the University of Illinois in Chemical Engineering in February of 1948, will be located in the Chicago laboratories.

Norman V. Crabtree, Abrasive Engineer in Lansing, Mich., for Norton Company, Worcester, Mass., has been appointed for the territory centering around

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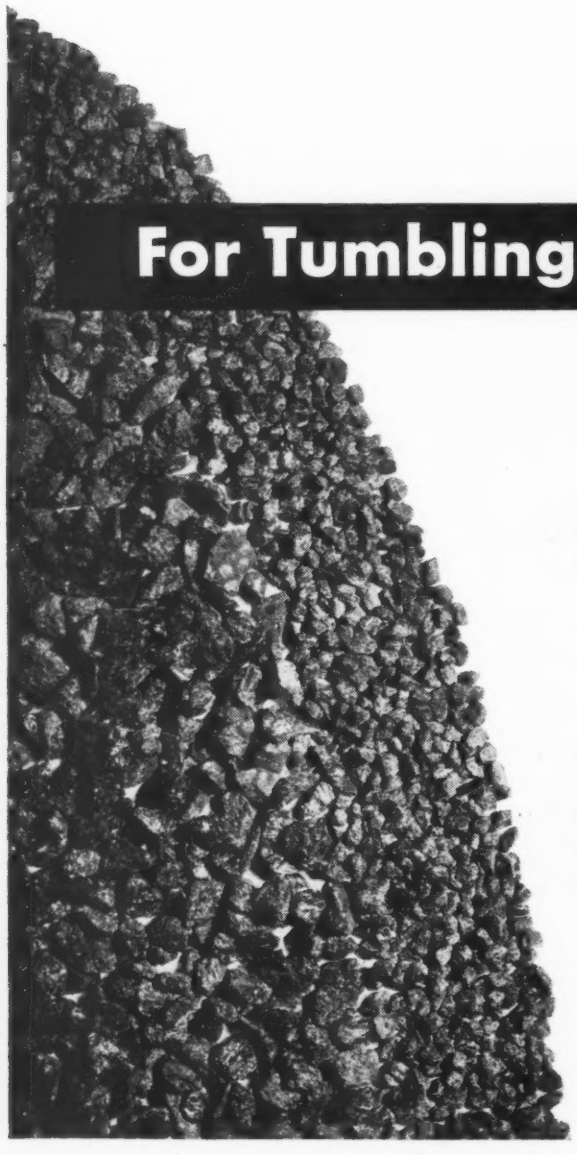
EXTREMELY hard, sharp, and tough—uniform in chemical composition, crystal structure and grain size and shape—that's ALUNDUM Polishing Abrasive!

- Try S-Treated ALUNDUM Abrasive for fast cut on your roughing operations.
- Try B-Treated ALUNDUM Abrasive for a general purpose abrasive for roughing and finishing when long life is of primary importance.
- Specify R-Treated ALUNDUM Abrasive for your finishing operations when glue is used as the adhesive.

You'll discover that ALUNDUM Abrasive speeds-up polishing jobs and produces better results for less.

For Polishing



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ALUNDUM Tumbling Abrasive can save you time and money too!

- It's *all abrasive* for a continuous cutting action.
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- It's *hard* and *tough* for a long, productive life.

For further details on ALUNDUM Abrasive for polishing or tumbling, contact your Norton abrasive engineer or distributor, or write for the free booklets "Setting-up Metal Polishing Wheels and Belts," and "Precision Tumbling with Alundum Abrasive."

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PROMAT 99-ZINC

This firmly established bath combines quality with speed and high efficiency. No. 99 zinc solution can be operated at current densities as high as two hundred amperes per square foot, in still tanks and semi or full automatic machines, with deposits of fine grain structure and uniform high brilliance. Promat No. 99 zinc is also unexcelled for barrel plating, offering unusual speed of deposition and fine color.

Promat No. 99 zinc consists of inexpensive make-up salts together with PROMAT C-42 addition agent, which aids in producing the characteristic high efficiency and brilliance of the bath, and PROMAT DOCTOR SOLUTION, which maintains its purity and freedom from heavy contamination.

PRO MAT
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PRO-SEAL is an outstanding product of Promat research. It was the first process to make available a bright, fully protected zinc surface by simple immersion alone.

The value of protected zinc is generally accepted, its resistance to white corrosion even under extreme conditions is proven. Pro-Seal gives maximum protection in a bright finish that greatly enhances the sales appeal of any product and enables zinc plating to compete in many fields with far more costly finishes.

THE PROMAT ORGANIZATION has devoted many years to research and development in the field of metal finishing, both protective and decorative. In our Waukegan plant, are extensive laboratories in which new products are developed; and a pilot plating plant in which new products are thoroughly tested on a production scale before they are released.

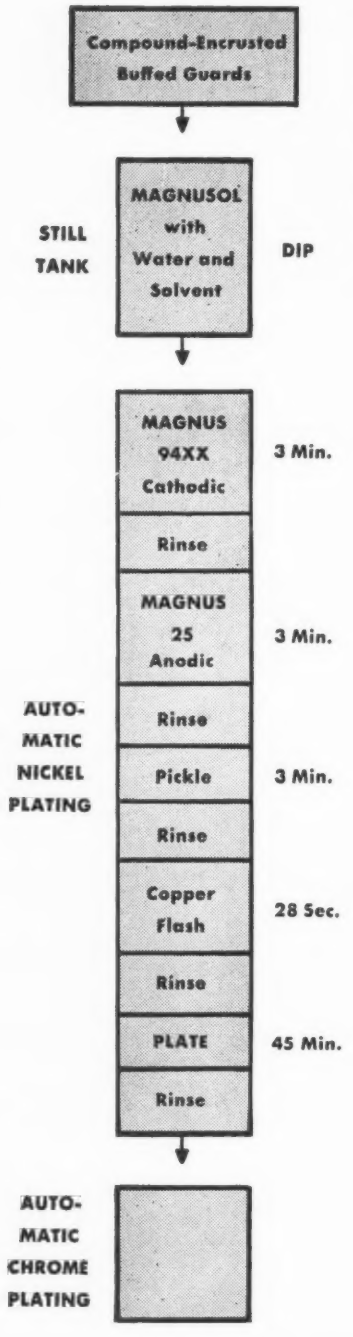
It is the aim of all Promat products and processes to produce higher quality finishes with maximum efficiency and at the lowest costs consistent with high quality.

Write today to

PRO MAT

PROMAT DIVISION, Poor & Company
851 SOUTH MARKET STREET, WAUKEGAN, ILL.

Magnusol Precleaning Ends a Serious Reject Situation in Bright-Nickel Chrome Plating of Steel Bumper Guards



On this plating operation the guards had to come from the bright nickel in such condition that no buffing would be required prior to chrome plating. Under their former method nearly 60% of the guards coming from the bright nickel either had to be color buffed and reworked, or were scrapped due to peeling.

Former Method

Guards were spray washed in alkaline cleaner, and then put through an automatic bright nickel plating machine, providing cathodic and anodic cleaning, pickle and copper flash before plating.

Magnus Method

Instead of spray washing, guards are dipped in Magnusol-solvent-water solution at 140° F. and then put through the automatic machine. Instead of the cathodic cleaner formerly used, Magnus 94XX was substituted, and instead of the anodic cleaner, Magnus 25. The only other change was to increase the copper flash part from 10 to 28 seconds.

Improvements

Rejects have been cut and held at a negligible level. Precleaning insures removal of maximum part of greasy, oily dirt, and keeps automatic machine free of contamination. Buffing compound is loosened and nearly all removed in precleaning dip, making the work of cathodic and anodic cleaning that much easier and their results much more dependable. Precleaning and Magnus 94XX are also used on a corresponding set-up for brass hub caps, with similar improvements in rejects.

If you are having reject troubles in plating, take a good long look at what precleaning with Magnusol can do to solve your problem.

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Service representatives in principal cities.

Personals

Flint, Mich. He will replace **Harlan T. Pierpont,** who is being transferred to Worcester to become Sales Manager of the company's Refractories Division. **Richard H. Merchant,** formerly Field Engineer in the Detroit area, is appointed Abrasive Engineer to take over the district recently covered by Mr. Crabtree.

H. J. Huester, Lieutenant Commander, U. S. N. R., Head of the Engineering Division, Bureau of Aeronautics, has been transferred from the Office of Bureau of Aeronautics General Representative, Central District, Wright Field, to Bureau of Aeronautics, Washington, D. C. Educated at Drexel Institute of Technology, George Washington University, Case School of Applied Sciences and Temple University, Mr. Huester has held responsible positions with the Navy Department since 1918 with exception of 1940–1943 when he was Technical Director with the Reynolds Metals Company. He is a member of a number of technical societies, among them American Electroplaters' Society.

Edwin C. Rinker, who recently joined Bart-Messing Corporation, was previously associated with A. Robinson & Son, precious metals refiners in New York City.

Dr. Joseph J. Mattiello, Vice-President and Technical Director of Hilo Varnish Corporation, passed away on May 16, 1948. He was only 00 years old. An outstanding lacquer and paint technologist and the friendliest of men, he will be greatly missed by his associates and many friends.

Dr. Charles F. Bonilla has been appointed Professor of Chemical Engineering at Columbia University where he will direct research and teach in the field of chemical engineering thermodynamics. Dr. Bonilla, a former student of Dr. Colin G. Fink, comes from Johns Hopkins University in Baltimore, Md., where he was Professor of Chemical Engineering.

Albert J. Capalbo has joined the Flexible Plastic Coatings Department of Interchemical Corporation's Finishes Division and will serve in both a sales and technical service capacity with headquarters in Elizabeth, N. J.

Mr. Capalbo, who received his technical training in chemistry at the Newark Technical School, Newark, N. J., brings to Interchemical a background of more than twelve years in the manufacturing and printing of flexible plastic coatings. He recently completed two years as chief chemist for the Plasticote Fabrics Corporation of Passaic, N. J., formerly manufacturers of coatings for textiles and specialists in vinyls.

WARNING NOTICE—Jackson Buff Corporation of Long Island City, N. Y., has rights to U. S. Patents Nos. Re 19,894 and 2,140,208 which have broad claims covering an air cooled buff having means for the admission of air through the sides of the buff. Owner intends to protect all rights and stop infringement.

JACKSON BUFF CORPORATION

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Personals

Ferdinand C. Wehrman has recently been appointed to the post of Engineering Editor of Organic Finishing. He has been associated with the staff of Finishing Publications, Inc., since May 1947, and besides the regular monthly issues of Organic Finishing, he has devoted a great deal of his time to assembling and editing the first Guidebook-Directory for Organic Finishing.

Mr. Wehrman received his Bachelor of Science degree from Fordham College and was formerly connected with Castor Oil Products, Inc., of Yonkers, N. Y., where he was assistant to the chief chemist.

John W. Beaver has been named sales representative for the Special Chemicals Division of the Pennsylvania Salt Manufacturing Company in the newly created Maryland, Washington, D. C., and Virginia District. Formerly sales representative in the Wisconsin territory, he joined Pennsalt on February 1, 1946, after nearly four years' service in the United States Army Air Force. He is a former resident of Pittsburgh, Pa. and a member of the American Electroplaters' Society.

Dr. W. M. Langdon has recently joined the staff of Graham, Crowley & Associates, Inc. Dr. Langdon will be located in the Chicago laboratories as Senior Chemical Engineer in charge of Chemical Engineering Research. He was formerly Associate Professor of Chemical Engineering at Rensselaer Polytechnic Institute of Troy, N. Y.

Joseph A. Korany has joined the Research and Development Laboratories of Quaker Chemical Products Corporation, Conshohocken, Pa. He will undertake market studies, including field testing, of new products as well as new applications of old products, as part of a broadening Quaker program into fields not now being served.

Dr. Gustav Egloff, Director of Research, Universal Oil Products Company, has been re-elected president of the Chicago Technical Society's Council. **Dr. Clyde A. Crowley** of Graham, Crowley and Associates, Inc., is the Executive Vice-President. The Chicago Council is a federation of not less than fifty-three professional groups, among them the Chicago Branch, A. E. S.

Howard Marston, for the past ten years sales and service engineer at the Boston Branch of the Minneapolis-Honeywell Regulator Company, has been appointed industrial manager of the Brown division of the company in Minneapolis and St. Paul. **Earl S. Bush** has been named Chicago industrial sales engineer for the steel industry for the Brown division, succeeding A. J. Potts. **Larry E. Singleton** will succeed Mr. Bush as the Chicago Branch industrial service manager. **I. K. Farley** is now industrial manager of the Houston, Texas Branch of the same division.

†**John Andryski** of Milwaukee, Wisc., died on June 3. At his death he was one of the older members of the American Electroplaters' Society, having joined it in November, 1914. He was made an honorary member of the Society's Milwaukee Branch on October 4, 1946.

†**Edward J. Peebles,** who had been with the Naval Research Laboratory since 1941, died on May 20 after more than a year's illness. He was active in the Baltimore-Washington Branch of American Electroplaters' Society, serving as Librarian during the year 1947-1948. His loss is deeply felt by all his associates.

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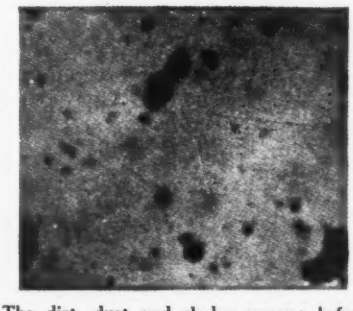

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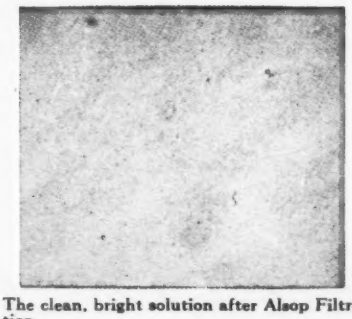

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Editorial

August 1948

THE SALT SPRAY TEST

ONE OF THE GOOD things that came out of World War II was a standardized salt spray test. Under the pressure of war conditions it was possible to reach widespread agreement on the use of one salt solution composition, one fog temperature, one controlled range of fog density, and one designated position of the surface being tested, all of which were incorporated in Federal and A. S. T. M. specifications. For the first time it was possible for several laboratories to obtain substantially the same result on testing the same articles.

A recent paper by Darsey and Cavanagh, preprinted with the 1948 report of Committee B-3 of A. S. T. M., has indicated need for even closer control of air pressure and fog *p*H for fully standardized conditions in the salt and spray cabinet.

In spite of all the work that has been done, difficulties still remain. On one hand there are still people who refuse to go along with the majority and insist on their own pet salt concentrations, surface positions, etc. On the other hand, there is mounting evidence that the corrosion rates obtained under the standardized conditions are higher than those had under the average conditions prevailing prior to standardization.

Since the salt spray requirements in individual specifications as a rule have not been modified, suppliers to the automotive industry, for example, claim it impossible to meet them consistently with minimum coating thicknesses equal to or even higher than those specified. Recently a study has been initiated to determine whether the specified numbers of hours prior to failure are too high or the definition of failure can be interpreted too severely or both.

When one views this confusion and considers that at best the salt spray test takes such a long time that results can be had only after the lot from which the samples were taken have or should have been assembled, one cannot but wonder if all this salt spray test activity is justified as far as the electroplater is concerned. Might it not be better to devote the efforts toward further investigation and standardization of the ferricyanide-chloride tests which were recently studied by Thon and Addison and which produce results in a matter of minutes or less?

Gustaf Soderberg

Ventilation IN THE PRODUCTION PLATING PLANT

V. P. JOHN

American Blower Corporation, Detroit, Michigan

The subject of ventilation in the production plating plant is most timely because of the movement now on foot to write new industrial ventilation codes, to revise and bring up to date existing codes, and to prepare means for their enforcement. Since this movement may well become national in scope, both the operators of plating plants and the suppliers of equipment are likely to become affected by the codes governing ventilation.

THE VENTILATION of a plating plant can no longer be accomplished by adding fan equipment as an afterthought after all really usable space has been taken up by other equipment. The growing complexity of the production plating system and the increased use of conveyors which take up more and more overhead room make the design of a proper ventilating system an economic and engineering problem which must be given full consideration when the plating system itself is being designed and not after it has been completed. This applies equally to the smallest job shop installation and the largest automatic plant. The purpose of this paper is to discuss the design of a proper ventilation system for a production plating plant.

The system, as designed, must accomplish the following:

(1) Remove all steam and water mist from liquid surfaces before they have an opportunity to get out into the factory and strike cold surfaces, where they can condense and drip, or increase the rate of corrosion of steel work or machinery, or rot other building material.

(2) Remove corrosive or toxic fumes before they can possibly come in contact with humans within the working areas.

(3) Dispose of the fumes on the outside of the building where they cannot possibly do any harm, or clean the fumes before they are emitted.

(4) Discharge the fumes where they cannot reenter the building or any other building, either naturally or through some mechanical air supply system

(5) Replace eventually any air exhausted from all area with outside air which, in temperate climates, will have to be heated and in dirty industrial areas will also have to be cleaned before being admitted to the building.

(6) Permit effective maintenance of the plating system, including the ventilation system itself.

Once a system has been designed to accomplish all of these things and has been properly installed, it can be expected to produce the following real advantages:

(1) A noticeable elevation in the plant of what the author chooses to call "the human standard" due to cleaner atmosphere, better visibility and better health.

(2) Reduced absenteeism, according to many authorities.

(3) Saving in the cost of repair and replacement of building construction.

(4) Insurance against damaging legal expense on account of preventable occupational hazard or injury.

The ventilating system may require sacrifice of easy accessibility of the plating machinery because of the enclosing duct work and hoods; to reduce this difficulty requires much ingenuity on the part of designers.

The cost of operation of the ventilating system must also be considered. This cost will include not only the power to run the exhaust fans but also the maintenance of the exhaust system, including periodic wash-downs and painting, and the power to operate any mechanical air supply system. In connection with the latter, many do not realize how much heat is removed by exhaust systems and has to be replaced by the factory heating plant. It takes 25 boiler horsepower to heat 10,000 cubic feet per minute (cfm) of outside air from zero to 70°. On the basis of as little as 200 cfm per square foot of solution surface, 10,000 cfm will take care of only fifty square feet or a tank measuring say 11 by 4½ feet. This of itself will indicate that the extravagant use of air is not economically feasible and should be avoided.

The ventilation of each tank should be considered separately from the standpoint of available space and the way by which work enters and exits. The nature and degree of the nuisance and also the possible interference by the ductwork will determine the type of system and its magnitude.

In discussing the systems to be used for various types of tanks, certain definite quantities of exhaust air will be mentioned which we have used successfully. Some of these values may be challenged as being too large or too small; in some places they may not even be sufficient to meet some code requirement with which we are not familiar. Judging from what little printed information is available and from our own experience, we are of the opinion that the figures presented here, in general, represent good practice and furnish a sound basis for approach to the problem. If existing codes require an increase in the amount of air handled, this can be accomplished, but even if lesser amounts are permitted by law, we would hesitate to recommend any reductions.

In order to cover nearly all the possible types of systems which will be encountered, let us take a large automatic installation as an example. It may begin with a power washer, which is an enclosure in which the pieces are sprayed vigorously with a recirculating alkaline solution. The power washer will have openings for work entering and leaving. There is much internal disturbance, but it is well contained, and only enough air need be drawn off to insure that the spray and mist will not eject from the openings in the casing. An air velocity of 100 lineal feet per minute (lfm) through all of the openings is sufficient, and 10,000 or 15,000 cfm of air should take care of the largest washer of this type.

Hot rinse tanks are often all alike on the same installation, and exhaust is necessary only to prevent nuisance and to protect adjacent construction from rust and drip. Side hoods may be adopted, and 200 cfm per square foot of liquid surface with a slot velocity of 2,000 lfm on two sides should be adequate unless the tank is very large. The velocity has been selected on the basis that there should not be less than 100 lfm velocity toward the slot at the middle of the tank to offset the stack effect of the hot steam.

The ventilation requirement for electrocleaners, hot electroplating tanks, and the like is reasonably severe because of the presence of toxic fumes or noxious gases; in addition there is the stack effect of high temperature to consider which may either offset or help the ventilation, depending on the design of the ventilating system. Therefore, if we have selected a nominal figure of 200 cfm per square foot of exposed liquid surface for hot rinse tanks, we are not justified to figure any less for the cleaner tanks. Since chromium plating fumes are especially dangerous and heavy, 250 cfm per square foot of exposed surface had better be employed with chromium tanks.

The large amount of exhaust air becomes a problem where tanks are large, as in some of the large automotive installations of today. For these large installations the author would recommend that the center section of the tank be covered with a multiplicity of small hoods of identical size, or with removable panels, each small enough so that it can be easily removed for access to tank or electrodes. Such hoods should be as close to the liquid surface as possible, within 10 or 15 inches of the liquid.

The areas so covered can be left out of the calculation of air quantity because the hoods act as a cover plate over the center section and have a negative pressure beneath them to prevent escape of fumes. The exposed edges of the hoods then act in the same manner as the conventional side slots for the balance of the liquid surface which is not covered by hoods. Should the exposed surface still be too large for satisfactory coverage by the area around the hood perimeters, then additional side slot ventilation should be used. If there is not sufficient room for the rather bulky ducts required for the side slots, an air supply system of very small dimension can be used to blow a thin curtain of air gently across the liquid surface toward the hoods to start the fumes in that direction and to bring them within "reaching distance" of the hoods. It has been found that a tank measuring 10 by 20 feet with the middle 8 feet covered by the method of partial hooding can be ventilated with about 24,000 cfm. The same tank unhooded would certainly have required 200 cfm per square foot of surface or a total of 40,000 cfm, and the situation would have been further complicated by the very real problem of designing side hoods that would be effective in the center of a 10 feet wide tank.

Small tanks are used in the majority of plating installations, and it is not often that one has to go to the extreme designs just mentioned. Small tanks are usually ventilated through side slots alone, unless there are a great many of them and it is desired to reduce the air quantities to an absolute minimum.

Where fumes are corrosive, special attention should be given to protection of the ventilating system itself from the corrosive action of the fumes. Because fans and ducts of special metals are very expensive, one should consider the possibility of combining all noncorrosive ventilating air into one system and making the acid-fume handling system entirely separate, thus reducing the overall cost.

For acid dip tanks, owing to the harmful effect of any escaped fumes, it is well to figure the top quantity of 250 cfm per square foot of liquid surface. As the tanks are usually small, this seldom introduces any difficult problem.

Most strip tanks are also small; since the fume evolution is vigorous, one leans toward the high figure of 250 cfm for them also.

Of special importance is the material and coating of the ducts and fans. The choice is between special metals, which have high first cost but require little maintenance, and standard steel coated with acid

(Continued on page 862)

Jess E. Bunch

JESS E. BUNCH, best known as Jack Bunch, one of a family of eleven children, was born on May 6, 1901 in Oaktown, Indiana. After completion of high school he found it necessary to secure employment and had to continue his education in night schools and through various college extension courses. His college training has covered such varied subjects as the need of his particular employment or job assignment dictated, including mechanical engineering, salesmanship and personnel relations, chemistry and electrochemical engineering, business management and, most recently, foundry technique.

After serving an apprenticeship as a toolmaker, Bunch was employed at his trade in various railroad shops from 1918 to 1925. In the latter year, he became a mechanic with the Cadillac Motor Car Division of General Motors Corporation. He was shortly promoted to a supervisory position and served Cadillac in various supervisory capacities in the Machine Shop, Press Room, and Inspection until 1936.

In 1932, Bunch was assigned to the Metal Finishing and Electroplating Division and was shortly promoted to an Assistant Superintendent's responsibility. Over the years that followed the Cadillac Plating Division has progressed from a small activity, which was required to produce only a minor part of the plated ware used on the Cadillac car, to one of the most modern electroplating and finishing plants in the automotive industy, producing essentially all of the electroplated ware on the Cadillac automobile. It has led the way in trying out and adopting new processes and equipment.

Upon assuming the responsibility for electroplating, Bunch became associated with the American Electroplaters' Society. He has been an active member of the Detroit Branch since that time and has served in several capacities, among them on its Board of Managers. Being acutely conscious of the need to publicize the Society's activities, he contributed substantially to the planning which led to the promotion of its Public Relations Committee. He is well known for the many technical papers which he has prepared and for his particular emphasis on quality through deposition of heavy coatings and simultaneous reduction of the cost per square foot of area plated.

In 1941 Bunch was promoted to Production Superintendent and in the war effort was assigned the responsibility of the Welding Division on tanks. At the end of the war he reassumed, as Production Superintendent, the responsibilities of the Electroplating and Finishing Division and also the activities of the Grey Iron Foundry Division.

Residing in the country, at 35345 West Seven Mile Road, Farmington, Michigan, he practices gardening and has many flowering shrubs and flowers with which he spends considerable time. A closely related hobby is color photography, which he uses to register his gardening accomplishments.

PURIFICATION OF A SMALL WATTS TYPE NICKEL PLATING BATH

N. L. CARTER

Electrolux Pty. Ltd., South Yarra, Victoria, Australia

With an Introduction by

J. J. DALE

Munitions Supply Laboratories, Maribyrnong, Victoria, Australia

Introduction

The subject of purification of Watts bath may be most conveniently summarized by setting out in tabular form the main types of impurity and listing for each the sources, effects, and treatments for removal. This has been done in Table I. Further details of effects of impurities and their removal are to be found in the literature[1–4,6–9].

Recognition of the impurity, or at least of its type, should be the first step and should be followed jointly by treatment for removal and steps to prevent or minimize its future introduction.

A skilled operator can often identify the impurity from its effect on the deposit but this should be verified by analysis in the case of metallic impurities[10,11], or if organic contamination is suspected, its presence and approximate quantity may be determined by a laboratory scale permanganate treatment[1], as described in the early part of the article.

Table II shows the *p*H (electrometric) at which a metal begins to precipitate as hydroxide on nickel hydroxide addition. Suitable current densities for removal by dummy plating are also set forth.

Intermittent dummy plating usually suffices to keep metallic impurities within reasonable limits, but some large capacity plants, especially those plating brass holloware, require continuous dummy plating on a proportion of the solution in a separate tank.

Condition of Bath

A Watts type nickel plating bath of approximately 300 gallons, which had been in use for five years without any purification other than that of slow continuous gravity filtration through felt, had arrived at a stage where very brittle deposits were being formed with a pronounced tendency towards pitting which was not easily dissipated by daily additions of hydrogen peroxide.

Preliminary Work

Since tests had pointed to the presence of a considerable amount of organic matter, it was decided to purify the bath using the potassium permanganate treatment. The original method, first described by Hothersall and Gardam[1], had been modified slightly for use in this instance.

The recommended procedure was as follows:

(a) Maintain temperature of solution throughout treatment at 50 to 60° C

(b) Adjust *p*H to 3 with sulfuric acid

(c) Add sufficient potassium permanganate solution to produce a persistent faint purple coloration, the solution being agitated vigorously while the addition is being made

(d) Turn off air agitation and allow the precipitate (largely manganese dioxide) to settle over night

TABLE I. PURIFICATION OF WATTS TYPE NICKEL PLATING BATHS

Type of Impurity	Effects	Sources	Treatments for Removal
Metallic	1. Dark plate (Cu, Zn) 2. Hard, brittle plate 3. Peeling	1. Added salts 2. Base metal being plated, e. g., Zn or Cu from holloware 3. Poor rinsing causing drag-in 4. Impure water supply	1. Dummy plating 2. Precipitation 3. Cementation
Organic	1. Brittle plate 2. Cracking and peeling of deposits 3. Pitting	1. Added salts (wood, bags) 2. Anode bags, filter cloths, and cloth tank covers (dextrin) 3. Wooden tank tops 4. Breakdown of addition agents 5. Air agitation (oil)	1. Activated carbon treatment 2. Oxidation with peroxide or permanganate
Suspended Matter	1. Pitting 2. Rough deposits	1. Dust from air 2. Bath reactions ($Fe(OH)_3$) 3. Anode slime 4. Polishing compounds	1. Filtration 2. Settling
Excess oxidizing agent (chromates, nitrates)	1. Reduced efficiency 2. Dark plate 3. Brittle plate	1. Mixed rinsing 2. Poorly insulated plating racks	

TABLE II. PURIFICATION *p*H AND CURRENT DENSITY FOR REMOVAL OF METALLIC IMPURITIES IN WATTS TYPE NICKEL PLATING BATHS

Metallic Impurity	Precipitation *p*H Electrometric	Purification Current Density asf
Iron (ferric)	4.7	4–5
Iron (ferrous)	5.5	4–5
Zinc	5.8–6.0	4–5
Copper	5.8–6.0	1–2
Chromium	6.0–6.2	...
Nickel	6.6	...
Lead	...	1–2

(e) If any purple coloration remains next morning, add sufficient hydrogen peroxide to remove it. The solution must be vigorously agitated during this addition and an excess of hydrogen peroxide avoided

(f) Re-agitate, and filter.

Laboratory scale trials, following the foregoing procedure, indicated that approximately 20 ounces of permanganate would be required to treat the 300 gallons of solution. It was found that the quite bulky precipitate of manganese dioxide settled readily on standing over night. However, a slight excess of hydrogen peroxide not only discharged all remaining purple coloration from the solution but tended to redissolve the manganese dioxide as well. It was, therefore, decided to ignore step (e) and add hydrogen peroxide, if necessary, after filtration.

The recommended procedure was further modified owing to the lack of a suitable means for filtering 300 gallons of solution quickly, and it was arranged that after allowing the precipitate to settle over night, the supernatant clear solution would be pumped into clean 44-gallon drums while the bottom few inches of solution containing the sediment would be discarded.

Permanganate Treatment

This program was followed, except that it was not found necessary to add the whole calculated quantity of potassium permanganate. This is explicable if the samples taken several days earlier had not been representative, which points, of course, to the need for extreme care in sampling. The detailed course of treatment was that described below.

The *p*H of the agitated solution was lowered to 2.7, and sufficient permanganate solution added to give a persistent purple coloration. The air agitation was then stopped, and the bath allowed to settle over night. Next morning the clear solution was pumped into empty clean drums; it was found desirable to discard the bottom 3½ inches remaining in the tank. A thick, greenish-yellow sludge was found to have settled on and behind the glass walls of the tank as well as on its bottom. Subsequent qualitative analysis

pointed to the following probable composition of this sludge: nickel oxide from the depolarized anodes, basic ferrous sulphates, trace of lead sulfate, and manganese dioxide formed during the purification treatment. The tank was cleaned out, new glass fitted, and the solution returned to the tank the following morning, having remained in the drums for 24 hours. Analysis showed no apparent alteration of any of the main constituents of the bath from the purification process. Appropriate additions of nickel sulfate, nickel chloride and boric acid were then made to adjust the composition of the solution to specification.

Plating Results

It was at once found that plating results at a current density of 15 to 20 asf were seriously awry, black, uneven and sometimes iridescent and streaky coatings being obtained. A curious feature was that "flashes" of the uneven, streaky, blue-black coating faded to some extent on removal from the bath, transforming apparently into a more or less normal white nickel. This phenomenon was noted during the first plating tests after treatment when time of plating did not exceed 30 seconds. When this time of plating had been exceeded, the tendency to fade became progressively less apparent. Investigation into the type and cause of contamination of the solution led to the discovery that zinc was present in the bath to the extent of 1.26 g/l, having been introduced by storing the solution during the purification treatment in zinc coated drums.

With such a relatively high metallic contamination perhaps the obvious means of removing the zinc would have been chemical precipitation. However, because of lack of suitable means of filtration and of suitable containers to hold the filtered liquid, it was decided to remove the zinc by low current density plating.

Electrolytic Purification

The *p*H at this stage was found to be 5.4, having risen apparently because of neutralization of the sulfuric acid by zinc. It was lowered to 4.0 by further addition of sulfuric acid, large iron cathodes totaling approximately 20 sq.ft. were introduced into the bath, and continuous plating effected at approximately 3 to 4 asf (3 volts pressure) using violent air agitation. After 24 hours of such dummy plating, the cathodes were covered with dark, uneven, at times nodular, peeling deposit . At this stage, test plating at 15 to 20 asf still produced black nickel, which, however, was now coating the cathodes evenly, the streakiness noted the day before no longer being apparent. Low current density electrolysis was continued for 24 hours longer, following which bright, white, and extremely brittle nickel was produced on test plating at 20 asf. The cathodes were scoured and replaced, and dummy plating continued for a further 24-hour period. At this stage, after 72 hours continuous dummy plating, brass items were plated at 20 asf and were coated with a dull, white nickel, inclined to be brittle. Since the *p*H had risen during this treatment, it was adjusted to 4.9, at which level a bright, brittle deposit was obtained throughout the day. However, the bath was now much improved and workable from a production point of view.

Obviously, further dummy plating was called for, and this was effected throughout the next night. It was found that dark metal was still being plated out at a low current density, but the bath was now working fairly well at normal current densities, giving a semi-bright, rather brittle nickel showing some evidence of pitting. It was decided to work the bath at normal current densities during the day and continue to plate out impurities at low current density over night until a soft, white nickel was produced at 4 asf.

Next morning it was found that the dummy plating had produced deposits lighter in color than previously but still extremely brittle and peeling extensively. At normal current density there was now extensive evidence of pitting whether the bath was worked still or agitated. A feature noted at this stage was that agitation yielded an extremely brittle, bright deposit whereas the bath when worked still but otherwise under identical current and other conditions produced a white, relatively ductile deposit. In an endeavour to overcome the pitting, the *p*H was raised to 5.35 by an addition through gauze of nickel hydroxide, freshly produced by adding caustic soda solution to approximately 1 gallon of the nickel bath. The tendency to pit at once diminished and soon disappeared, and the deposits were now relatively ductile, though still too hard. Generally speaking, results were considerably better than had been obtained from this bath for a number of months.

After two nights' further dummy plating, it was found that a relatively pure nickel was being produced at low current densities, though still showing some tendency to peel. Since the nickel being deposited at 20 asf was now white, medium soft, and ductile, it was decided to discontinue dummy plating.

As a matter of interest, analysis had shown that the deposit plated at low current density after approximately 48 hours' continuous plating consisted of a nickel-zinc alloy containing approximately 87 per cent of nickel. After three nights of further dummy plating the metal being deposited contained 99.6 per cent of nickel; zinc was found to be present qualitatively and probably accounted for most of the remaining 0.4. Tests performed on the deposits obtained by dummy plating showed a progressive lowering of hardness from day to day: the deposits obtained early in the treatment approximated 600 to 700 Knoop while those obtained towards the end of the dummy plating showed 250 to 300 Knoop.

Additional to the foregoing is an experience with dummy plating in another nickel bath of approximately 100 gallons capacity. It was noted that articles plated in this bath were rough as though suspended matter had been occluded in the deposit, espe-

(Continued on page 864)

ELECTROPLATING OF ROLLER CHAIN

A Report by the Technical Committee of the Roller Chain Group of the Association of Roller and Silent Chain Manufacturers, G. G. Mize, Chairman

SINCE YEARS of investigation, research, and experience warrants the conclusion that plating of assembled precision steel-roller transmission chains is extremely hazardous, the Association of Roller and Silent Chain Manufacturers advises that the maker cannot and will not be responsible for the service of chains so plated.

During the last war, many instances were reported wherein plating of assembled steel roller chains by uninformed individuals resulted in actual or potential damage to equipment.

Many purchasers have plated standard assembled steel-roller chains either to improve their superficial corrosion resistance or to change their visual appearance. The results are seldom satisfactory, and frequently the chain is damaged to the point where it is not safe to use. In addition it is impossible to plate the inner parts of assembled chains where it is needed for corrosion resistance, and a uniform covering of external surfaces is seldom obtained because of poor electrical contact in the chain.

The following details are submitted to support this general statement. The construction of a roller chain is shown in Fig. 1. In order to provide the strength required for normal service, the side plates are commonly made from medium carbon steels heat-treated to Rockwell C-40 to C-45. For wear resistance the pins and bushings are carburized and heat treated to produce a file hard surface.

The bushings and pins are retained in their respective side plates by press fits which must be tight enough to prevent any movement between the fitted parts in service. The required resistance to movement is not obtained until the press fit is sufficient to cause the steel around the pitch hole of the side plate to be plastically deformed to a slight extent. The internal stress in the side plates at these zones must, therefore, be of the order of 200,000 psi and, of course, these stresses must be balanced by similar ones in the mating pins or bushings.

The side plates and rollers of standard roller chains are usually oxidized (colored straw, blue, or black) to provide an attractive appearance and some resistance to superficial rusting. It is not possible to apply a satisfactory plate over this oxide layer, and while it can be removed in inhibited weak acids, there is grave danger that enough hydrogen will be evolved to make the steel so brittle that the side plates will crack or split and the bushing will crack or break down circumferentially.

In the electroplating process, the object to be plated must be the cathode, and even under carefully controlled conditions enough atomic hydrogen will be evolved and absorbed by the steel in the assembled roller chain parts to provide the same results.

Typical failures produced by these operations of color stripping and plating are shown in Fig. 2. A cracked side plate cannot support the normal service loads, and the chain may break apart completely. Cracked bushings will break up under normal service, and rapid wear will result.

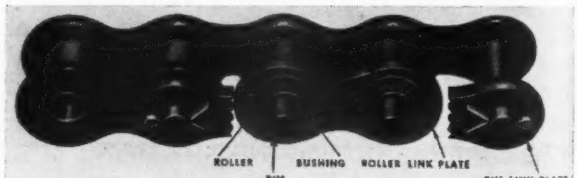

Fig. 1. Construction of roller chain

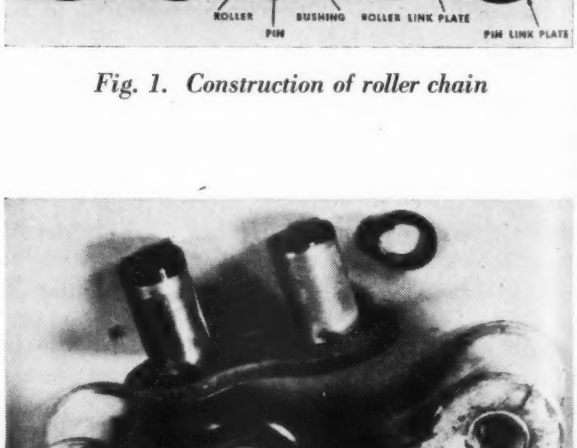

Fig. 2. Typical failures in plated chain

As already stated, the exact mechanism of hydrogen embrittlement is not completely understood. Experiments undertaken to study this phenomenon have proved that roller chain parts of the same analysis, metallurgical characteristics and mechanical fits will not always fail when electroplated under the same conditions, but failures occur often enough to make it positive that it is not a safe practice.

BRUSHES IN THE FINISHING INDUSTRY

A. J. CHANDLER

The Osborn Manufacturing Company, Cleveland, Ohio

BRUSHES OF SIMPLE construction are very old tools, their use in industry dating from its beginning. Periodically, someone has found that a brush could do a particular job especially well. Frequently in such cases, a brush came into use as part of a method, or process, or procedure. This created a new demand. As this demand grew, brush makers were encouraged to provide themselves with more elaborate and more expensive equipment. By some such steps as these there came into existance a manufacturing industry producing brushes of many styles and makes.

The brush maker has had to do the same as other tool makers: study the jobs that users of industrial tools want done, and bid for those jobs that could be done better and more economically with brushes than with other means.

Many tools will do all that is needed except deliver the finishing touch. Some finishing tools that do an exceptionally fine job are not particularly well suited for the in-between jobs. For example, a solid grinding wheel will remove material but is not necessarily a practical tool for producing final surface finish of high color.

Then, too, there are other factors such as the shape of the part that greatly influence the type of tool which must be used. Brushes, because of their flexibility, will follow the shape and contour of the surface to be finished without removing an appreciable amount of metal. This feature makes the application of brushing easier for the operator in that the brushing pressure can be varied within wide limits as compared with the pressures used with solid grinding wheels and hard-faced wheels.

Selection

In order to discuss brushes intelligently, we must outline briefly how to go about selecting a power brush for a manufacturing operation. If we were to look at the large number of available types and sizes of power brushes, it would be quite a complicated procedure to determine the brush best suited for the job in mind. However, if a few brush characteristics are considered and understood, step-by-step selection is not at all difficult.

It is a common practice to use one brush for several different kinds of work, and this may be a practical approach where job lots of parts are manufactured; however, where parts are finished on a mass production basis, the correct brush for each job is a necessary requirement in order that operational cost be kept at a minimum. The most reliable method of selecting the correct brush is to conduct actual tests under existing operating conditions. Experience teaches that local conditions vary and that a brush which gives low cost and high quality in one plant may not necessarily be the best brush for use in a different plant.

In selecting a brush for test it is necessary to consider the *essential brush specifications*:

1. Type of fill material—brushes are filled with a wide variety of fill materials, such as wire, fibre, nylon, cord, etc.

2. Size of fill material—the coarseness or fineness of the fill material is, of course, a very important factor in the resulting surface finish.

3. Effective trim length—the effective trim length of the brush is the length of material extending beyond the face plate or the brush back. Reducing the effective trim length reduces the amount of flexibility embodied in the brush which is important in controlling the effectiveness of the brush.

4. Density—the amount of fill material in the brush can be varied to increase or decrease the flexibility of the brush.

5. Outside diameter of brush—the outside surface of the brush is, of course, where the work is being done. It can be used as a variable factor in increasing or decreasing the peripheral speed of the brush.

6. Surface speed—the speed of rotation of the brush is another factor controlling its flexibility. It may be necessary to reduce the speed sufficiently to give the necessary flexibility for uniform brushing of the entire surface of parts which have slots, contours, and other irregular surfaces.

A list of *specific tasks* that brushes will perform would be too long for the available space and perhaps somewhat uninteresting, but one might profitably characterize a few types of jobs that can be done well by means of brushes:

1. Moving, removing, or assisting in removing granular material, dust, or any other finely divided material, whether wet or dry.

2. Breaking or loosening and removing or assisting in removing thinly encrusted material, such as scale, residue, rust, stain, etc.

3. Knocking off burrs and smoothing edges or surfaces from which the burrs have been removed, as long as the size of the burrs is within reasonable limits.

4. Polishing sharp corners and providing them with uniform radii whenever relatively small radii are satisfactory. For this work, as in some other cases, the assistance of some abrasive material may be necessary.

5. Blending surfaces.

6. Refining a surface and making it more uniform.

One example of brush applications for the removal of more or less finely divided matter is the scrubbing of metal sheet, performed either at the mill as part of the manufacturing operation or at the plant of the user as a precautionary measure to prevent damage during forming, stamping, etc. The removal of residue burden from conveyor belts is another example. The distribution of pumice, zinc oxide or similar powdery materials in the surface treatment of sheet rubber, plastics, fabrics, paper, etc., is a third example. This kind of work may require either a stationary type brush or a power driven brush. Frequently, brushes for this purpose are of the large cylindrical type, power driven at speeds suitable for the job in question.

Cord Buff Brushes

The term buffing embraces two operations, "cutting down" and "coloring", and is distinct from polishing or grinding in that the abrasive, instead of being glued to the wheel, is applied to it in the form of a bar stick or liquid suspension containing a binder. Buffing is employed where the surface does not require removal of a substantial amount of metal or as a final finishing operation to obtain a high luster after preliminary polishing.

The preparation of the part to be plated may necessitate several operations prior to buffing. The first step may be wire brushing for cleaning the surface. This may be succeeded by a tampico operation with a cutting compound. The buffing which follows is generally performed with a sharp or fast-cutting buffing compound to smooth the surface and bring up as bright a finish as possible in one operation. Should a higher or brighter finish be required, an additional operation, coloring, is performed using a milder buffing compound.

The buffing brushes shown in Fig. 1 are the results of several years of study to determine the size of cord best suited for cutting down and coloring, respectively.

The specially treated No. 61 Cord, which is the heavier of the two, when used in conjunction with a cutting compound, not only cuts exceptionally fast and has longer life than some buffs, but also provides a surface that needs little coloring. For some operations on some materials it is said to work as well as a polishing wheel.

Because of the toughness and hard working face of this buffing brush, it works best on automatic equipment but is not limited entirely to such applications.

The brush sections are assembled with a ventilating adaptor which assists greatly in keeping the sections from overheating and burning. In addition to the ventilating adapters, which can be had in either pressed board or steel, a ventilating flange has been designed which makes the outside air circulate through the sections (Fig. 2).

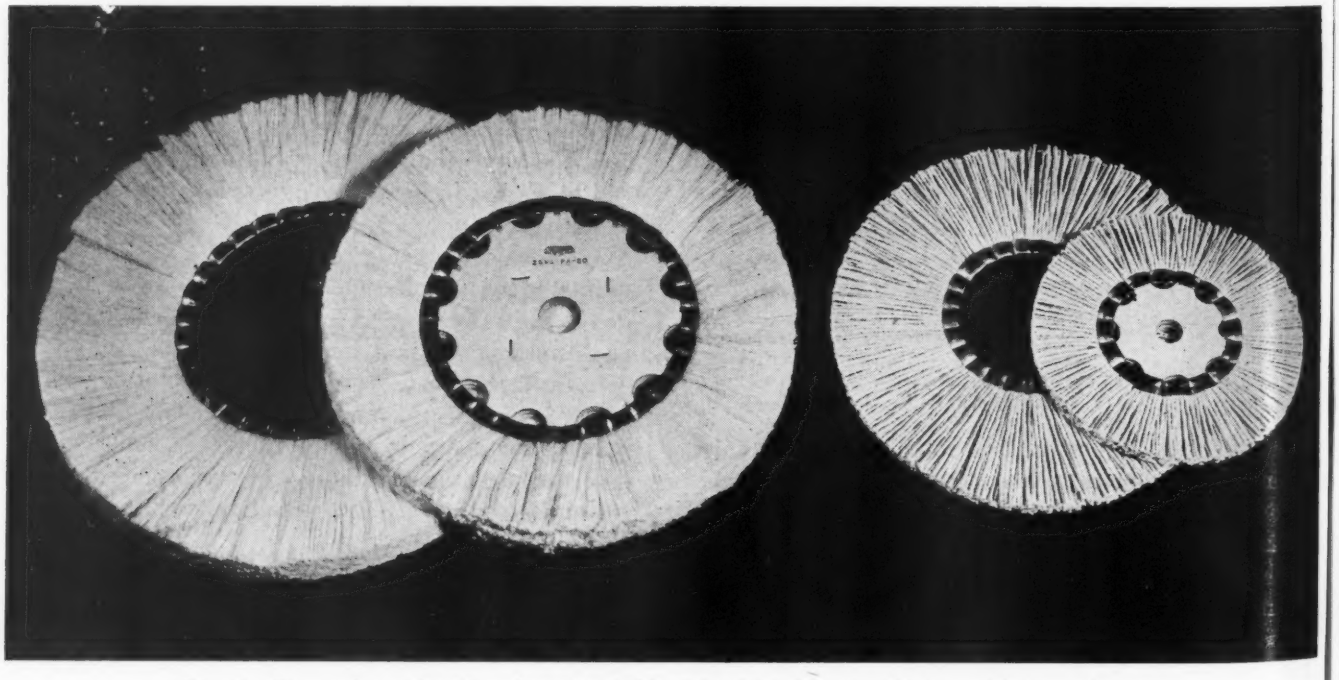

Fig. 1. Examples of buff brushes. Left, No. 60; right, No. 61. Note ventilating adaptor

Recently in a large automatic plant the No. 61 cord brush supplanted buffs made of sisal cloth and other buffs for the buffing of 8 x 10 inch scuff plates of stainless steel, the reasons being both faster cut and higher luster.

Material cost may also be very low. A recent test in which lots of over 91,000 stainless steel wiper arms were buffed with each kind of wheel (Fig. 3) gave the results shown in Table I. Not only was the cost for the buffing brushes exceedingly low but the finished product was also superior.

The No. 60 cord buffing brush was developed for coloring and light coloring. When used in conjunction with such coloring compounds as whiting, the natural color of the base metal is brought out with a high luster. Satin, butler, or matte finishes can also be obtained very readily with this brush by using a glue-base compound or a mixture of emery and oil of the consistency of waffle batter. This cord can also be used for light polishing operations by setting the face with a glue-base abrasive. We like to think of this buffing brush as being unusually suitable for coloring because its flexible trim is already in the condition which most buffers produce with a rake.

Buffing brushes work differently than ordinary buffs in that they conform to the contours and radii of the part to be buffed. Their flexibility permits the handling of irregular shaped parts on which buffs cannot perform satisfactorily.

As previously indicated, wheel speed is an important factor in all buffing and polishing. It varies widely depending upon the particular job to be done and the material to be worked. It is quite difficult to suggest wheel speeds for any specific operation that are applicable in all cases, because such operating conditions as compounds, pressures and cord sections vary a great deal from plant to plant. However, a few typical ranges of values are presented in Table II.

It should be emphasized that high speeds require good wheel ventilation if burning of the cord and excessive wheel wear are to be avoided.

TABLE I. COMPARATIVE MATERIAL COST OF BUFFING WIPER ARMS

Wheel	Cost per 1000 wiper arms, $		
	Wheel	Compound	Total
Brush, No. 61 cord	0.181	0.104	0.285
Buff A	1.75	0.22	1.97
Buff B	2.29	0.21	2.50

TABLE II. USUAL BRUSH SURFACE SPEEDS

Base Metal	Brush Speed, 1000 ft/min	
	Cutting down	Coloring
Copper alloys, soft metals	8.5–10	6.5–8
Nickel, nickel-silver	9–10	7–8
Stainless and carbon steels	10–12	10–12

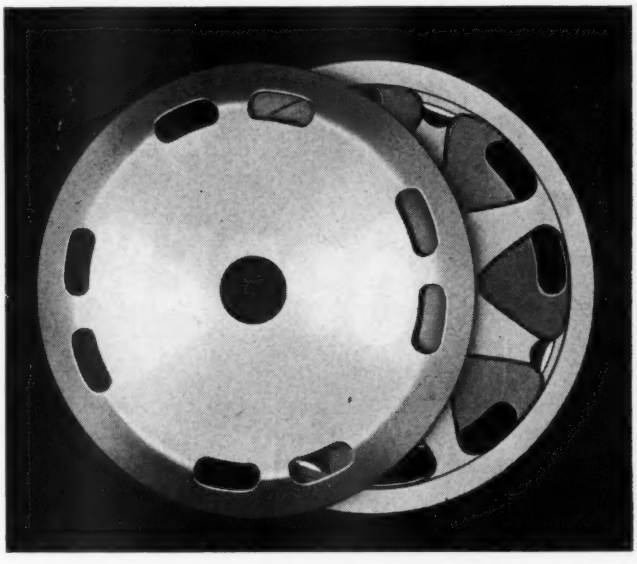

Fig. 2. Ventilating flange

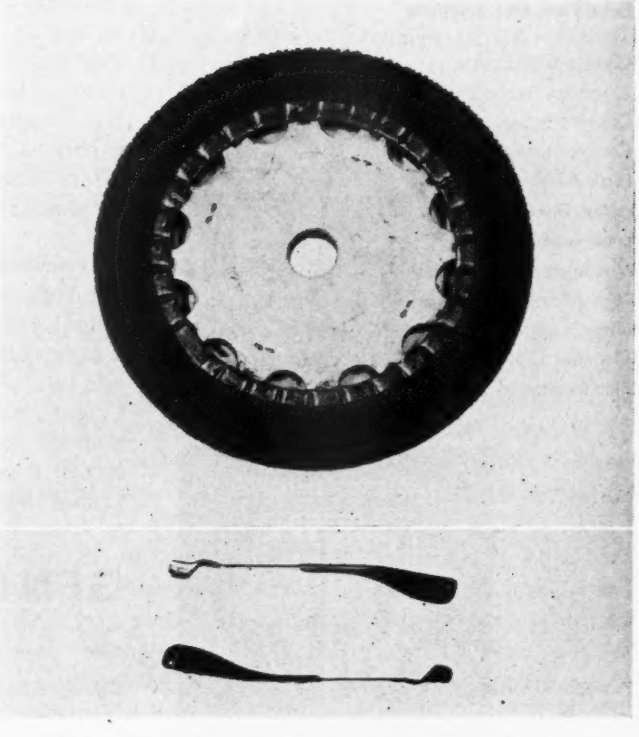

Fig 3. One of a set of four brushes, No. 61, after finishing of 91,360 stainless steel wiper arms shown below

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METAL FINISHING TRAINING

at the

ROCHESTER INSTITUTE OF TECHNOLOGY

JAMES WEAVER
Chief Chemist and General Foreman
Metals Division, Hickok Manufacturing Company

AND

WALTER F. SWANTON
Staff Member
Rochester Institute of Technology
Rochester, N. Y.

This article has been submitted for publication not merely to gain publicity for the program outlined herein but also to offer the ideas it contains to other educational institutions and to inspire similar programs for the advancement of the science of electroplating and for the opportunity they give to those employed in the trade to learn the scientific, theoretical, and practical aspects of their work. Any inquiries or suggestions will be appreciated and should be addressed to Mr. Swanton.

CLASSES IN METAL FINISHING were started last fall in both the Day and Evening Schools of the Rochester Institute of Technology. The Evening School class is taught by the senior author and the Day School class by the junior author. The success of the program has been evidenced by regularity in attendance of students and the growing popularity.

The Institute now operates three-year programs leading to a diploma in both the Day and Evening Schools. Day students can attend classes full time, or, by attending in alternate blocks, spend equal periods of time in the classroom and in cooperative industrial employment. Among the industries employing students on the cooperative plan are the Eastman Kodak Company, Hickok Manufacturing Company, and Taylor Instrument Companies. Evening School students are drawn from full-time employees of local concerns, last year from Wollensak Optical Company, Eastman Kodak Company, Stromberg-Carlson Company, and Hickok Manufacturing Company.

The history of these courses in Metal Finishing dates back to 1945 when several leading members of the Rochester Branch of the American Electroplaters' Society suggested such a program to Dr. R. L. Van Peursem, Supervisor of the Department of Industrial Chemistry. The need for such training facilities and the suitability of the Institute as a center for furnishing them were readily apparent. Accordingly, an instructor, possessing the necessary qualifications, was employed to take charge. The instructor, Mr. John Lander of the Naval Research Laboratory, met with an interested group of members of the A. E. S. during 1946 and initiated plans for courses and obtaining laboratory equipment. Early in 1947, however, he returned to the Navy, and the following August, the junior author, a chemical engineer of the Institute Staff, was placed in charge. About the same time, the senior author, who had recently come to Hickok Manufacturing Company from the National Cash Register Company, Dayton, Ohio, was engaged to teach the evening classes.

Day School Classes

The objectives of the Day School are to qualify high school graduates for rapid promotion to supervisory positions in the Metal Finishing Industry, and to provide industry with employees with more detailed knowledge of the technical as well as the practical side of their jobs. During his three years' instruction, the student receives intensive training in the sciences and humanities at the Institute and practical work experience in the metal finishing departments or laboratories or both of cooperating industries. Upon graduation, he generally becomes a full-time employee of the plant wherein he did his cooperative work.

Day students take the regular Industrial Chemistry curriculum and, in addition, certain courses dealing specifically with metals and metal finishing. A complete list of the courses is given below. (An asterisk indicates those dealing specifically with finishing.)

First Year

General Chemistry	Human Relations
Qualitative Analysis	Study Technique
Mathematics	Report Writing
Physics	Metal Finishing*

Second Year

Quantitative Analysis	Economics
Organic Chemistry	Metallurgy*
Electricity	Corrosion and Organic Coatings

Third Year

Physical Chemistry	Industrial Chemistry
Industrial Organization	Electroplating*

The first year course in Metal Finishing is intended as a survey or orientation course. Its objectives are to develop a coordinated picture of modern methods and their purposes and to impart a working vocabulary of metals and metal finishing. The major topics discussed are: Metals, Electrochemistry, Corrosion, Preparation of Base Metals, Electroplating, Other Metallic Coatings, Surface Treatments, Coloring, Organic Coatings and Temporary Coatings. Simonds and Bregman[1] is used as a textbook and is supplemented by mimeographed materials and lectures.

A brief course in Metallurgy is offered during the first term of the second year. It deals primarily with the manufacture of metals and entails some laboratory work. The text adopted is Frier.[2] During the second term a combined course in Corrosion and Organic Finishes is given. Mimeographed notes are used for the work in corrosion, but a textbook by Wampler[3] has been adopted for the Organic Finishes portion. Laboratory work is planned in connection with the course.

During the third year Electroplating is studied in considerable detail. Blum and Hogaboom[4] is used as a textbook and is suplemented with up-to-date mimeographed materials and reference articles. Laboratory work constitutes a major activity throughout the year.

The electroplating laboratory is being built around a pilot-plant line of 20 gallon tanks for cyanide copper, bright nickel, and chromium plating. Included with these plating tanks are tanks of appropriate capacity for soak-cleaning, electrolytic cleaning, cyanide dipping, pickling, and hot and cold water rinsing. Other major equipment items include a buffing lathe, a tumbling barrel, a centrifugal drier, and a degreaser.

Power requirements are met with two selenium-type rectifiers of 150 and 100 ampere capacity. For smaller scale work, several 5-gallon earthware tanks and a 40-ampere copper-oxide rectifier are available. The flexibility of this equipment enables the students to study the characteristics of any known plating solution on a semi-production basis

Facilities for testing solution consist of usual chemical apparatus, Hull cells, 5-ampere rectifier, electroanalyzer, and Beckman *p*H meter. A salt-spray chamber, Magne-gage and drop-test apparatus are available for testing electrodeposits.

Experimental work performed by the students consists of (a) making up solutions, (b) preparation of analytical reagents and analysis of the solutions, (c) buffing and cleaning of the work, (d) stripping of deposits, (e) inspection and testing of deposits with respect to identification, porosity, thickness, and corrosion resistance, (f) study of theoretical and practical characteristics of various solutions, (g) study of the effects of variation of the solution components, (h) study of the effects and methods of removing impurities, and (i) research to improve existing formulas or to develop new formulas.

Local suppliers to the plating industry have contributed supplies and chemicals. We wish particularly to thank The Udylite Corporation for providing bright nickel, MacDermid Incorporated for bright copper and cleaners, and Lea Manufacturing Company for compounds and buffs.

As the program becomes more established, it is hoped to extend the laboratory facilities to include alloy deposition, anodizing, plating on non-conductive surfaces, organic finishing, and surface treatments. It is also hoped that this laboratory will be able to serve the local industries in solving technical problems.

Night School Classes

The Night School course was started last Fall and, as it was a new subject, no advance publicity was given. Classes were held on Tuesday and Thursday evenings from 7:30 to 9:30 P. M.

"Principles of Electroplating" by Blum and Hogaboom was used as a reference book, but the majority of the lessons were given from mimeographed sheets which provided the students with the most up-to-date material selected from articles in Plating, "Metal Finishing", *A. E. S. Proceedings*, and other sources. During the term several guest speakers donated their services and several companies allowed us to inspect their plating departments.

The first semester was devoted almost entirely to lectures and demonstrations, but about one-half of the time in the second semester was devoted to laboratory assignments.

An outline of the course will show the comprehensive program which was given. It may be changed at the instructor's discretion, either to devote more time to insure proper understanding of a subject or to include new or timely subject matter of interest to the students.

First Semester

Week	*Tuesdays*	*Thursdays*
1	Principles of Chemistry	Principles of Chemistry
2	Principles of Electricity and Electrochemistry	Principles of Electrochemistry and *p*H
3	*p*H and Hull Cell Determinations on Bright Nickel. Review of preceding subject matter	Quiz on subjects covered so far. Passivity, Polarization and Throwing Power
4	Hull Cell Determinations on Variety of Plating Solutions (written reports on results by students)	Selection, Specification and Inspection of Electrodeposits

Week	Tuesdays	Thursdays
5	Clinic Night on Faulty Plating. Study of Base Metal before Plating (microscopic)	Metal Cleaning and Pickling. Condition of Base Metal
6	Metal Cleaning and Pickling	Character of Deposits and Bancroft's Axioms
7	Factors Affecting Deposits (demonstration)	Electrochemical Theory of Corrosion
8	Laboratory Testing of Electrodeposits (thickness, porosity, ductility, crystalline structure, and adhesion)	Quiz on barrel finishing
9	Plant visitation	Buffing and Polishing Various Metals
10	Copper Plating (guest speaker)	Bright Nickel Plating (guest speaker)
11	Zinc and Cadmium Plating	Gold and Gold Alloy Plating
12–13	Christmas Vacation	Christmas Vacation
14	Chromium Plating	Hard Chromium Plating (guest speaker)
15	Anodizing of Aluminum	Special Finishes on Metals (Parkerizing and Bonderizing, Electrocolor and Pattern Plate, black nickel and oxidized finishes)
16	Plating on Aluminum	Plating on Non-Conductive Surfaces
17	Review of semester's work	Examination on first semester's work

SECOND SEMESTER

Week	Tuesdays	Thursdays
1	Review of Chemistry. Balancing of Equations	Review of Electrochemistry. Metric System
2	Use of Metric System (laboratory)	Elementary Principles of Quantitative Analysis of Plating Solutions
3	Preparations of Standard Solutions. Use of Analytical Balance (laboratory)	Normality and Standard Solutions. Reagents and Indicators
4	Elementary Principles of Volumetric Analysis of Plating Solutions (laboratory)	Calculations in Plating Analysis. Quiz
5	Volumetric Analysis of Plating Solutions	Gravimetric Analysis of Electrodeposits
6	Colorimetric Analysis of Plating Solutions. Determination of Impurities in Plating Baths (laboratory)	Colorimetric Analysis of Plating Solutions
7	Quiz on Analysis (laboratory)	Functions of Plating Laboratories
8	Experimental Plating (individual laboratory assignments)	Research and Testing in Electroplating
9	Experimental Plating (laboratory)	Plating to Specifications
10	Experimental Plating (written reports on assignments)	Temperature Controls and Other Instruments in Electroplating (guest speaker)
11	Experimental Plating (written reports on assignments)	Electrical Instruments, Generators and Rectifiers
12	Plant visitation	Materials on Construction in Plating Plants
13	Effects of Impurities in Plating Baths	Plant Layout and Design. Review and questions on second semester's work
14	Removal of Impurities from Plating Baths	Final examination
15	Open (laboratory)	Summary

COOPERATIVE EMPLOYMENT PROGRAM

The industries are cooperating with Rochester Institute of Technology not merely to give students employment during the periods when they are not in school but also to increase their knowledge by practical application and further extension of their education in metal finishing.

During their work-blocks, students are shifted frequently so as to spend a portion of their time on every possible phase of the industry. Frequent conferences are held to review their problems, and every effort is made to give them information pertinent to their work. Their school grades are available to their employers, and they are graded on their work-habits to correlate their education and practical training.

As an example of the methods used by one industry to train these students, the program developed by the Hickok Manufacturing Company and approved by R. I. T. will be described. The student spends from eight to ten weeks in each department.

Relieving Department—The students learn to produce the various finishes obtained with scratch-brush wheels, cloth wheels, satin finish wheels, string wheels, etc. Every effort, consistent with production requirements, is made to let them devote a portion of their time to each type of finish.

Burnishing Department.—The students learn bulk methods of finishing such as bright dipping, fire scaling, deburring, tumbling, burnishing, and bronze plating.

Silver and Copper Plating Department.—The students learn the methods of cleaning, solvent washing, and silver, cadmium and copper plating of various base metals, including zinc base die castings. Both barrel and tank methods are covered.

Jewelry Plating Department.—The students again spend time on cleaning prior to plating to emphasize the importance of proper preparation of the work. The remainder of their time is spent bright nickel plating, rhodium plating, 24K-gold plating, and alloy-gold plating.

Buffing Department.—The students learn to use the higher speed wheels to remove burrs and to buff and color buckles and jewelry.

Laboratory.—The time spent in the laboratory gives students an opportunity to learn modern methods of controlling quality and production. They help maintain solutions by analysis, make additions to tanks, and learn methods of purification of solutions, salvage of precious metals, and process control and specifications. Usually, if the student is capable, he is given a research or experimental assignment during his laboratory time. *(Continued on page 835)*

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The Question Box

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Q. 27 In the Serfass-Levine report on the determination of lead in nickel baths (Monthly Rev. Am. Electroplaters' Soc. 33, 1085 [1946]; A. E. S. Research Report Serial No. 3, p. 19) under Procedure, step 14 reads, "Run a blank, going through the above procedure with the same number of dithizone extractions as were required to extract the lead. Record the scale reading of the blank (Note 4)."

We have obtained the results shown in Table A. An inspection shows that the number of extractions markedly affect the blank reading. However, when we set up our calibration with one 5-ml and one 2-ml extraction, we obtained a straight line that obeyed Bouguer-Beer's law perfectly. No other blank did that. The same kind of reasoning may be applied to the iron determination (Monthly Rev. Am. Electroplaters' Soc. 33, 1195 [1946]; A. E. S. Research Report Serial No. 3, p. 28). Are we wrong? It appears that either iso- or n-amyl acetate can be used for extraction of iron cupferride in the latter method. Which should be specified?

A. The increase in blank reading is normal inasmuch as each extraction removes more oxidized dithizone from the solution.—The observed straight line relation is probably fortuitous. It does not seem feasible that you will remove all lead with only two extractions. It is necessary to extract the blank the same number of times as the sample to remove the same amount of oxidized dithizone. Incidentally, the 2-ml extraction was not mentioned in the published procedure.—The reasoning applied to the lead determination may not be applied to an iron determination with ortho-phenanthroline in which the blank is run on the bath sample omitting the color developing reagent and not on a pure bath including the color developing reagent. With the bath sample as the blank, the number of extractions is not particularly important.—We used n-amyl acetate and do not know that isoamyl acetate works properly.—E. J. SERFASS.

Q. 28. I have a great deal of trouble with cadmium plate turning brown when I heat it to remove hydrogen embrittlement. What can I do to eliminate this difficulty?

A. The first thing to do is to make certain that the temperature is uniform throughout that portion of the oven in which the parts are placed. It has also been shown that cadmium plate which has been plated in a solution in which nickel is used as an auxiliary brightener can stand higher temperatures than pure cadmium plate without being oxidized.—K. G. SODERBERG

TABLE A

Test No.	Standard Nickel Solution Added ml	No. of Extractions		Fisher Electrophotometer Readings	Average Reading
		5 ml	2 ml		
1	0	1	1	17.5, 17.5, 17.5	17.5
2	0	1	2	21.5, 21.5, 21.5	21.5
3	0	1	3	28.6, 28.6, 28.6	28.6
4	1	1	1	19.0, 19.0, 19.0	19.0
5	1	1	2	24.4, 24.4, 24.4	24.4
6	1	1	3	28.0, 28.0, 28.0	28.0
7	2	1	1	18.4, 18.4, 18.4	18.4
8	2	1	2	21.5, 21.5, 21.5	21.5
9	2	1	3	28.5, 28.5, 28.5	28.5

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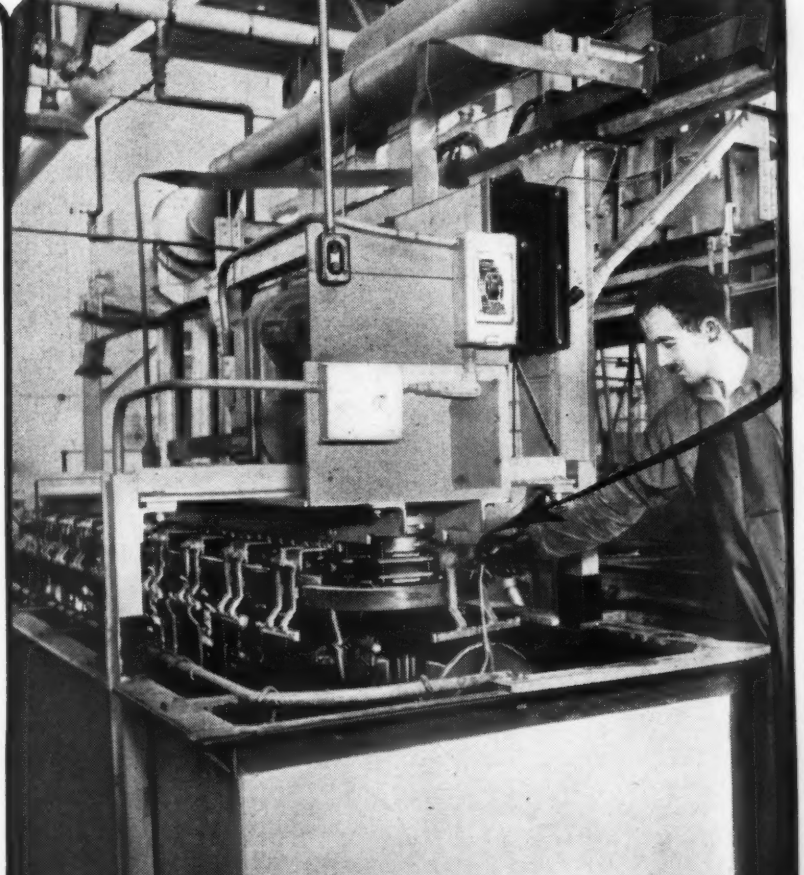

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Book Review

by DR. HAROLD J. READ,
Associate Professor of Metallurgy
The Pennsylvania State College

SURFACE CHEMISTRY for Industrial Research by J. J. Bikerman, 1947, ix + 464 pages. Academic Press, Inc., New York 10, N. Y. Price, $8.00.

This monograph is noteworthy in that it brings together in one volume a vast amount of hitherto widely scattered information which can be of inestimable value to the industrial chemist and, more particularly, the electroplater. The latter, of course, deals almost wholly with surfaces, and the majority of his processes involve chemical reactions at surfaces. Even polishing, which was formerly a completely mechanical operation, has in some instances become an example of applied surface chemistry through the use of electropolishing techniques.

It may appear that a great deal of the information in this book is in the realm of physics rather than chemistry, but an inspection of the literature references will reveal that the major part of the source material has been found in chemical journals. This is but another example of the futility of trying to establish a dividing line between the fields of chemistry and physics.

Because of the fact that surface chemistry is involved in an extremely wide variety of theoretical and practical problems, the organization of a logically arranged, concise and non-repetitious presentation of the subject matter is far from a simple task. The author has chosen to organize his material according to a classification based on the states of aggregation of the bodies separated by the surfaces, e. g., liquid-gas, liquid-solid, solid-gas, etc. This method appears to be eminently satisfactory since it is easy to find information on a given situation and there is remarkably little duplication from one section of the book to another.

Although it is well organized, the volume is not so much a textbook as an extended and fairly critical review of 1,044 selected literature references. The extent of the critical treatment of the various topics is not uniform throughout the book, and one suspects that the author has a great deal more interest in some parts of his subject matter than in others. This is not a surprising situation, and on reviewing the extent and diversity of the phenomena under consideration, one would hardly expect it to be otherwise.

While by far the greater portion of the book deals with subjects other than electrodeposition, the plater will be gratified by the number of items pertaining either directly or indirectly to his field, all of which, incidentally, may be readily located through use of the excellent name and subject indexes. While the author has not dealt with all the information available on surface chemistry as applied to plating and his references are incomplete, he has considered the more important and leading papers which, in turn, will disclose most of the remaining literature references. One would like to have seen the subjects of epitaxy and preferred orientation in electrodeposits treated at greater length, but it must be admitted that the paucity of data makes this a matter of wishful thinking rather than a legitimate criticism.

Some of the subjects which the electroplater will find of collateral interest are corrosion of metals, adsorption (particularly with respect to solution purification and the mechanism of bright plating), bubble formation and pitting, films, interfacial tension, potentials, surface roughness, wetting, and many others of equal or greater importance. The treatment of these subjects is interesting and valuable in itself, but in addition, the research worker will be provided with new and stimulating approaches to some of the problems which beset the electroplater.

In view of the importance of surface tension in liquid-gas systems, the author might well have devoted more attention to the methods used for the determination of the magnitude of this property. He has outlined briefly the principle and technique of each of the twelve methods which have received at least some measure of attention. While it is not suggested that detailed directions for carrying out measurements should have been given, it would have been helpful if more information had been offered on the relative usefulness and applicability of each method.

The author has assumed that his reader will be well grounded in fundamental chemistry, physics and mathematics, but he has at all times placed emphasis on the practical aspects of his subject rather than the theoretical. As he says, the book "is written for people who know what is being done in their plant but want to know why it is done in a certain way and whether it can be done better." This is a refreshing approach to a subject where pure theory has far outstripped practical interpretation or application in most instances.

Mr. Bikerman writes in a style that is clear and succinct, and he has compressed between the covers of his book a tremendous amount of information presented in an easily comprehended form. It is highly recommended to every plater who is interested in the scientific aspects of his work.

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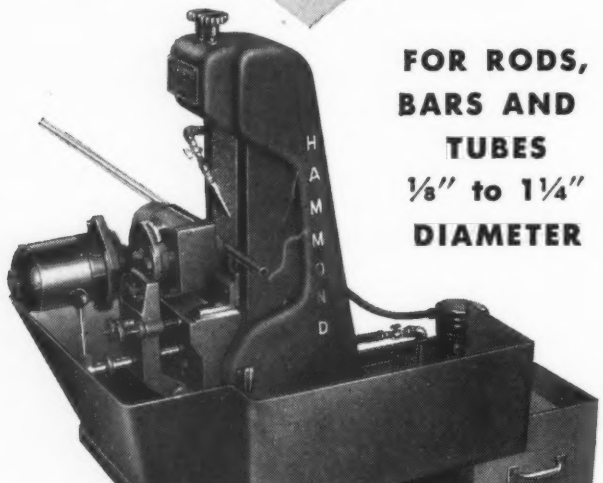

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Abstracts

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The Electrolytic Polishing of Brass Pressings. P. Berger. Sheet Metal Ind. **24**, 2437–2443 (December 1947).

Describes development of a satisfactory commercial process. Of three processes described in the patent literature, which were evaluated, only the chromic acid process gave good results. However, it was necessary to modify this process considerably for completely satisfactory results. Extensive details of both compositions and operating procedures are given. Includes information on applicability to various alloys and to plant layout and procedures.

The Determination of Tin Coating Weights on Tinplate. Hugh A. McKenzie. Soc. Chem. Ind. **66**, 312–319 (September 1947).

Methods for estimating weights by removing the tin coating quantitatively were critically examined. The action of several stripping reagents on both hot-dipped and electrolytic tinplates was studied by measuring weight losses and by metallographic examinations of the stripped specimens. Hydrochloric acid inhibited with antimony trichloride was the only reagent which completely removed the tin coating and the alloy layer from hot-dipped plates. Alkaline potassium iodate is a satisfactory alternative reagent for electrolytic plates. 30 ref.

Anodes—VII. Rolled, Forged, and Sintered Nickel Alloys. E. R. Thews. Metal Industry **71**, 383–389, 427–429 (1947).

Electrodeposition of Tungsten Alloys Containing Iron, Nickel, and Cobalt. Abner Brenner, Polly Burkhead, and Emma Seegmiller. J. Research Nat. Bureau Standards **39**, 351–383 (October 1947).

Describes methods developed for the above. Some of the properties determined indicate that the alloys may be of commercial value. The deposits are smooth, strong and brittle. The nickel and cobalt alloys become ductile on heating. As plated, the nickel and cobalt alloys have a hardness of 350 to 700 Vickers, and the iron alloy, 700 to 900 Vickers. The alloys undergo precipitation hardening and the cobalt-tungsten alloys retain hardness when hot. 27 ref.

Fundamental Aspects of Metal Cleaning. Jay C. Harris. Am. Ceramic Soc. Bull. **26**, 389–392 (1947).

The forces involved in the attraction between the metal surface and the various contaminants encountered are discussed, means for neutralization of these forces, and materials and methods with which to accomplish cleaning are described.

The Phosphate Layer: Its Appearance and Depth. E. Jaudon. Metaux et Corrosion **22**, 121–124 (July, 1947).
Gives results of a metallographic study of the structure of zinc phosphate and manganese phosphate layers. Includes photomicrographs.

Anodizing of Aluminum Alloys in Carbonate Solutions. Part II. Anodizing of Clad Duralumin at Different Temperatures and in Solutions of Different Concentration Using DC. A. F. Bogoyavlenskiy. Zhurnal Prikladnoy Khimii **20**, 613–619 (July, 1947); Light Metals Res. **9**, 132 (March 3, 1948).
Previous work had shown that in carbonate solutions the best results when anodizing clad Duralumin were obtained using direct current. The present results are presented in graphical form and indicate that a coating possessing high corrosion resistance can be obtained by anodizing in a 5 per cent solution of sodium carbonate at 30° C for 25 to 30 minutes at 5 asf and 110 to 105 volts. Coatings obtained in sodium carbonate solutions are characterized by their mattness. Their resistance to corrosion is not inferior to that of coatings obtained in sulfuric acid baths.

The Metallography of Electrodeposited Surfaces. (Continued.) **The Physics of Grinding and Polishing. Part I. The Influence of Machining Stresses on a Metal.** A. T. Steer. Electroplating (London) **1**, 91–102 (January, 1948).
Summarizes the fundamentals of metal-crystal structure as a preliminary to a consideration of the case of the effect of applied stresses (machining or otherwise) on a single metal crystal and the effect of such stresses on the massive metal.

Wrinkle Finishes—25 Control Points. E. A. Zahn. Iron Age **161**, 78–83 (January 15, 1948).
Twenty-five specific factors, each of which can have a marked effect upon the finish regardless of its type or texture, are discussed separately along with methods for controlling them.

Anomalies in the Appearance of Glide Ellipses. Robert Maddin. Metals Technology **15** (February, 1948), T. P. 2332, 6 pp.
Electropolishing has generally been assumed to eliminate the strain introduced by mechanical polishing and to result in a more truly representative surface, particularly in the case of soft metallic materials. However, glide ellipses were found to occur on electropolished surfaces of 99.975 per cent-pure aluminum crystals. Elongation and shear on specimens mechanically polished, then electropolished, and finally strained by use of a tensile machine, were determined by X-ray diffraction. Results are described and illustrated, but no attempt is made to explain the apparent anomalies observed.

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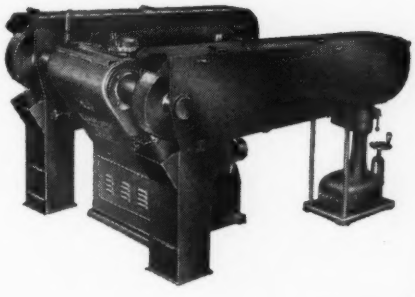

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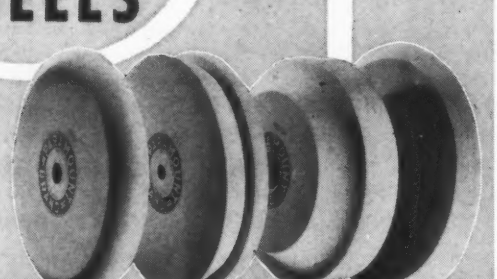

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A Study of Films Isolated from Passive Stainless Steels. E. M. Mahla and N. A. Nielsen. J. Electrochem. Soc. **93,** 1–16 (January, 1948).

By use of a bromine-methanol solution, the authors have been able to isolate passive films from electrolytic chromium, ferritic and austenitic stainless steel, and from the alloys Nichrome V and Inconel. These films were examined by both light microscopy and electron diffraction. Structures and compositions identified are described and illustrated.

Plating Chromium by Thermal Decomposition of Chromium Hexacarbonyl. B. B. Owen and R. T. Webber. Metals Technology **15** (January, 1948), T. P. 2306, 5 pp.

Outlines results of preliminary experiments upon the plating of chromium from its carbonyl and gives details of apparatus and technique. Thirty-six runs were made using mild-steel discs.

A Rapid Method of Analysis for Certain Surface-Active Agents. S. R. Epton. Nature **160,** 795–796 (1947).

The fact that certain cationic surface-active agents such as cetyl pyridinium bromide form stoichiometric salts with anionic surface-active agents such as the alkyl sulfates, alkyl sulfonates, and alkyl aryl sulfonates has been used as the basis of two titrimetric methods of analysis of the latter materials. However, neither method is completely satisfactory. Outlines a new method of end-point detection which gives accurate and reproducible results even in the hands of relatively unskilled personnel and under a wide variety of conditions.

The Glass Electrode; Temperature-Potential Relationships. J. Jackson. Chemistry & Industry, 7–10 (January 3, 1948).

Presents a thorough theoretical and practical development of the above relationships, which are said to be inadequately treated in the literature.

Molybdenum and Tungsten Coatings. Anon. Engineer **184,** 601 (1947).

A critical review of recent papers on formation of the above coatings by dissociation of carbonyl compounds of the metals and deposition of the resulting metallic vapor.

The Protection of Steel by Various Non-Metallic Coatings. J. C. Hudson and T. A. Banfield. J. Iron Steel Inst. **158,** 99–110 (January, 1948).

This is an interim report on the behavior of a range of protective non-metallic coatings applied to structural mild steel and exposed to field corrosion tests as part of the investigations conducted by the Protective Coatings Sub-Committee of the British Iron and Steel Research Association. The tests cover periods of up to five years. Includes results of sea-water-immersion testing.

Metal Finishing Training

(*Continued from page 820*)

Special Assignments.—After the student has worked on all the various jobs in the Metals Division, he is given a special assignment, such as manufacture of high priced jewelry, jewelry repair, expediting, or further laboratory work. An endeavor is also made to give the most promising students work during their summer vacation where they are most needed.

At the end of each work-block the students are required by the Institute to turn in a detailed report on their work and a description of the functions of the department in which they did their special assignment in relation to the Metals Division as a whole. These reports are turned in to the Personnel Department and the Plating Foreman for study and approval before being sent to the Institute. The foreman under which the student has worked turns in a report on the student which is sent to the Institute.

It has been recognized by the Institute that to get the most out of such a program the student should have certain initial training. Accordingly, it will now be necessary for the student to have had or to take courses in General Chemistry and in Quantitative and Qualitative Analysis before taking Metal Finishing. To gain his diploma in Metal Finishing the student must also take other subjects including Physics, Metallurgy, Management, Organic Finishing, Organic Chemistry, and Electricity. He may, however, take Metal Finishing during either the second or the third term.

The enthusiasm shown by the Night School students and their cooperation in getting this program under way has been gratifying to their instructor. Attendance records were almost perfect, and no students dropped out during the year. As most Night School courses have a 25 to 50 per cent mortality through a year, we can attribute this record to the intense interest shown by the students. The class average for the final examination was 83 per cent. Several students have commented favorably on the influence of the course on their possible advancement in their employment.

We are prepared to enroll a larger number of students next year and hope to contribute towards a fuller knowledge of the plating trade by those employed in Rochester. The knowledge gained should benefit both students and employers and help make Rochester an advanced city of the Metal Finishing Industry.

REFERENCES

1 "Finishing Metal Products", by Simonds and Bregman. McGraw-Hill Book Company.

2 "Elementary Metallurgy", by Frier. McGraw-Hill Book Company.

3 "Modern Organic Finishes", by Wampler. Chemical Publishing Company.

4 "Principles of Electroplating and Electroforming", by Blum and Hogaboom. McGraw-Hill Book Company.

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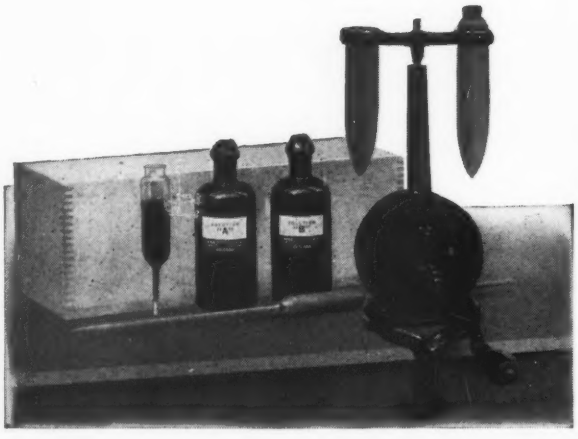

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Patents

By GEORGE B. HOGABOOM
Consultant, New Britain, Conn.

No. 2,440,672, May 4, 1948—Electroplating Bath for Silver—Harry J. Green, assignor to General Motors Corporation.

The primary object of my invention is to provide a new and improved bath and process for the electrodeposition of a metal such as silver in the form of a "bright" plate.

The brightening agents in accordance with the present invention are reaction products of ammonium thiosulfate with various suitable modifying agents. A composition that has proven highly satisfactory is a commercial X-ray fixer used to dissolve silver salts from X-ray film after exposure and development. This solution, hereinafter termed solution A, is composed substantially as follows: ammonium thiosulfate plus ammonium polythionates 32.5 per cent, acetic acid 3.5 per cent, boric acid 3.5 per cent, sodium sulfite 4.2 per cent, water the remainder. The solution has a specific gravity of 1.305 at 25° C and a *p*H of 4.25 at 25° C.

EXAMPLE I

AgCN.....38–55 g/l
KCN (free).....38–55 g/l
Solution A.....0.05–12.5 ml/l
*p*H.....10.3–14 (12 minimum preferred)

High silver cyanide content may be used if free cyanide content is increased.

EXAMPLE II

AgCN..... 100–120 g/l
KCN (free)..... 120–150 g/l
KOH (free)..... 15–50 g/l
Solution A.....0.05–12.5 ml/l

Current densities as high as 150 asf have been obtained with Example I containing 50 g/l free KOH with effective agitation. Bath voltage varies from 1.2 to 2.8 volts, bath temperature from about 90° to 130° F.

CLAIM 4. A silver-cyanide plating bath comprising essentially an aqueous solution of silver cyanide and an alkali metal cyanide to which has been added 0.05 to 12.5 ml per litre of a brightener comprising essentially an aqueous solution of ammonium thiosulfate, an alkali metal sulfite and acetic acid, said brightener having a specific gravity of approximately 1.305 to 1.311 and a *p*H of approximately 4.12 to 4.25 at 25° C.

4 claims.

References cited: U. S. Patent 2,110,792.

Trans. Electrochem. Soc. **59**, 320–335 (1931); ibid. 80, 473 (1941). Roscoe and Schorlemmer, "Treatise on Chemistry", Vol. I, 1920, p. 456.

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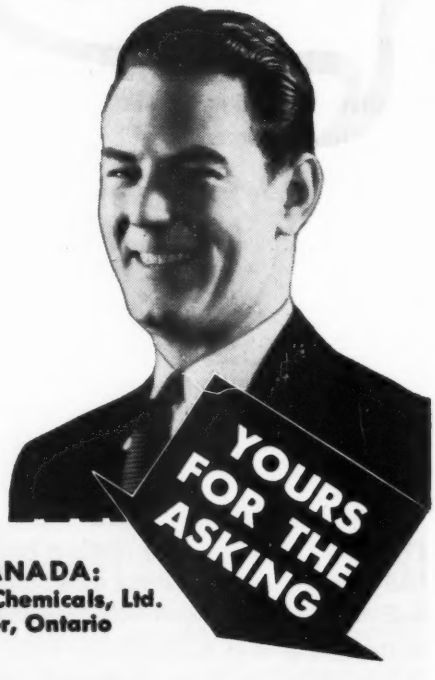
Now! **Goodbye to S. O.!** There's no Stockyards Odor in Gripmaster. It's clean, odor-free!



GRIPMASTER MEETS EVERY NEED

Gives astounding results on all metals—ferrous and non-ferrous. Ideal for plastics, too!

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☐ Send us a generous FREE SAMPLE of Gripmaster.
☐ Send us data on how to boost polishing production.
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COMPANY_____

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CITY_____ STATE_____

No. 2,440,715, May 4, 1948—Continuous Method for Electropolishing Nickel and Nickel Containing Alloys—C. L. Faust and P. D. Miller, assignors to Battelle Development Corporation.

Nickel and its alloys that are rich in nickel may be anodically polished in an electrolyte containing, as an essential active ingredient, sulfuric acid or a mixture of sulfuric and phosphoric acids. The concentration of the sulfuric acid when used alone as well as the combined concentration of the mixed sulfuric and phosphoric acids should be at least 50 per cent by weight of the solution and preferably not more than 95 per cent by weight of the solution, the balance largely water. For practical purposes, about 90 per cent is the upper limit for the total acid concentration. While it is possible to produce good polishes with aqueous mixture of sulfuric and phosphoric acids containing as much as 50 per cent water, it has been found preferable to keep the water content of the bath relatively low, since, in general, baths containing lower proportions of water may be operated at lower current densities and, therefore, at a lower cost to give satisfactory polishes. The relative proportions of essential acids may vary between rather wide limits, as, for instance, from about 3 per cent to 76 per cent sulfuric acid and from 0 to about 78 per cent phosphoric acid, the total acid concentration being more than 50 per cent.

We have found that addition of hydrochloric acid to the straight phosphoric acid and to the mixed sulfuric acid-phosphoric acid baths within general limits yield baths in which nickel or nickel-containing alloys can be polished to a bright, mirror-like pit-free finish at temperatures in the general range of from 80° to 140° F and at current densities from 50 to 300 amperes per square foot. We have further found that under these conditions the excess nickel dissolved from the anode can be continuously electrodeposited as metallic nickel on the cathode.

CLAIM 2. The method of electrolytically polishing metal selected from the group consisting of nickel and nickel alloys containing at least 90 per cent nickel which comprises making the metal the anode in an aqueous bath having a dissolved chloride ion content calculated as HCl of from 0.04 to 2.5 per cent by weight of said bath, the remainder of said bath consisting essentially of a composition lying within the closed area defined on the accompanying diagram by the dotted straight line KG and the dotted straight lines GL, LM and MB, passing through said solution, while held within a temperature range of from 90° to 125° F, an electric current of sufficient density and for a sufficient period of time to effect the polishing of said metal, and during said electropolishing maintaining said bath at that temperature within said range at which anodically dissolved nickel will be electrodeposited from said bath whereby the tendency of nickel salts to precipitate on continued operation of said bath is reduced.

6 claims, 4 figures, 7 tables.

Whatever your problem in finishing zinc or cadmium, there's an Iridite* to do the job. Iridite, a quick-dip, chemical treatment, offers you these three advantages—

Radio and hardware parts, permanently brightened with Iridite.

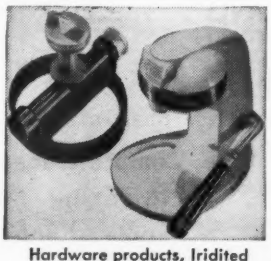
1. EYE APPEALING FINISH

On plated parts Iridite forms a long lasting, sparkling *bright* finish that *stays bright*, even after handling, storage, exposure. On all surfaces, Iridite can be used to produce a variety of colored finishes.

Wire cloth and galvanized bucket, Iridited for extreme corrosion-resistance.

2. RUSTPROOFING . . .

Resistant to the attack of water, gasoline, and ordinary corrosive conditions, Iridite provides the ideal *final finish* for all zinc and cadmium surfaces.



Hardware products, Iridited and painted for peak finishing system efficiency.

3. BASE FOR PAINT . . .

On any zinc or cadmium surface that must be painted, Iridite insures a better finishing system because the coating improves initial paint adherence, blocks corrosion *under* paint, blocks formation of metallic soaps *between* paint and metal.

● **Tell us the type of finish you need for zinc or cadmium—let us tell you how Iridite can help. For information and samples, write to:**

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401 Chemical Building
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Up to 29 Operations in Only 30 Minutes

For shops in which small space is available and ONE MACHINE must serve *many cleaning purposes.*

Here it is: AN AUTOMATIC BATCH PROCESS CLEANING MACHINE for cleaning surfaces after forging, stamping or forming . . . prior to painting or plating.

AUTOMATIC TUMBLING . . . CLEANING . . . RINSING . . . PICKLING . . . SOAP ROLL AND OTHER OPERATIONS IN THE ONE BARREL

Any solution can be used without loss.

- Controlled operation
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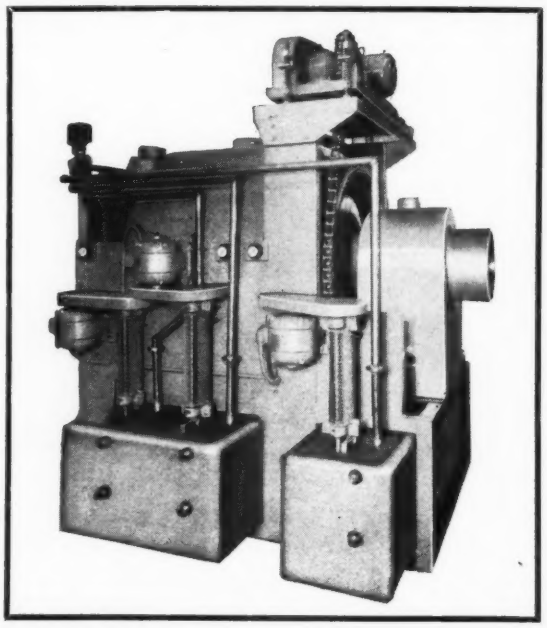
- Improved finishes



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N. RANSOHOFF, INC. CINCINNATI, OHIO

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References cited: U. S. Patents 1,918,477; 2,003,051; 2,315,695; 2,315,696; 2,331,721; 2,336,713; 2,336,714. German Patents 225,873; 682,248. British Patents 504,026; 526,966.

Modern Electroplating; 1942, p. 240. Trans. Electrochem. Soc. **78**, 265–272 (1940).

No. 2,442,591, June 1, 1948—Electrolytic Polishing of Stainless Steel—A. L. Feild, assignor to American Rolling Mill Company.

An object of my invention is the provision of a simple, direct and thoroughly reliable process of electrolytically polishing stainless steel, using an alternating electrolyzing current and low current densities.

Another object of my invention is the provision of an apparatus for electrolytically polishing stainless steel, which apparatus includes a compact assembly of equipment, which is installed and operated with a minimum of technical advice and skill, which is successfully energized from ordinary alternating current service lines, and which operation is thoroughly efficient and reliable in achieving highly polished stainless steel products.

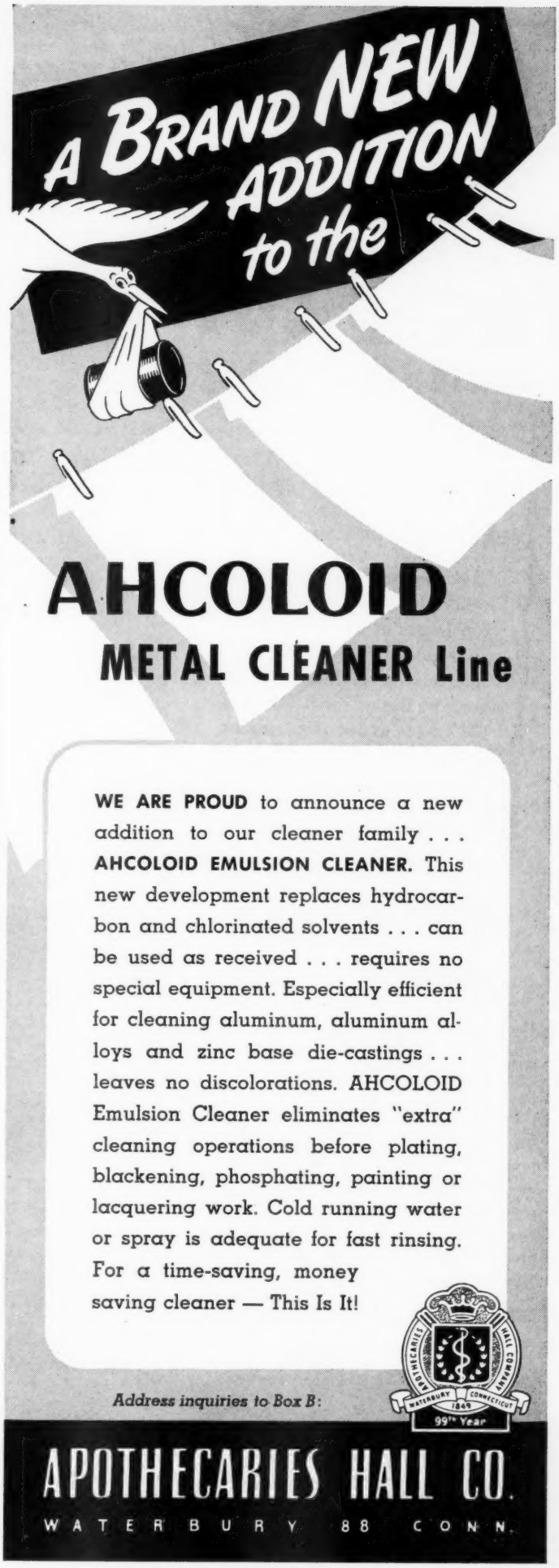
The art of electrolytic polishing, being relatively new in the stainless steel industries, still presents a number of difficulties. In this connection, it has been common practice in the heretofore known electrolytic polishing processes to employ direct current electrical energy which, where only alternating current is readily available, represents a problem. It becomes necessary to install expensive batteries or a motor-generator set to supply direct current in the polishing system and thus, in effect, the unit cost of polished steel produced is increased. Again, certain of these heretofore known processes frequently yield products which, because of being etched or discolored, are unsuitable for their originally intended use. Other such processes are not adapted for rapid, large scale production of polished stainless steel products and thus possess no great industrial utility.

CLAIM 3. In polishing a stainless steel product, the art which comprises immersing the product to be polished in a bath consisting by volumes of 80 per cent to 40 per cent concentrated nitric acid and 20 per cent to 60 per cent concentrated acetic acid, and passing only alternating current through said bath between the product and a cooperating electrode immersed therein while maintaining a current density of ½ to 12 amperes per square inch of product surface and the bath temperature below 25° C.

5 claims, 1 figure.

References cited: U. S. Patents 1,772,541; 1,787,672; 2,040,618. Italian Patent 372,802. British Patents 485,089; 521,290. French Patent 707,526.

Metal Progress, December, 1939, pp. 755–756. "Monsanto Chemicals", 26th Ed. (1942), Monsanto Chemical Company, pp. 21 and 81.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AHCOLOID
METAL CLEANER Line
WE ARE PROUD to announce a new addition to our cleaner family . . . AHCOLOID EMULSION CLEANER. This new development replaces hydrocarbon and chlorinated solvents . . . can be used as received . . . requires no special equipment. Especially efficient for cleaning aluminum, aluminum alloys and zinc base die-castings . . . leaves no discolorations. AHCOLOID Emulsion Cleaner eliminates "extra" cleaning operations before plating, blackening, phosphating, painting or lacquering work. Cold running water or spray is adequate for fast rinsing. For a time-saving, money saving cleaner — This Is It!
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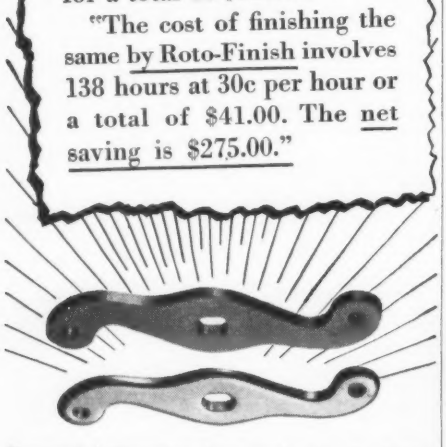
DOES CUT FINISHING COSTS

FISHING REEL MFR. REPORTS . . . (NAME ON FILE)

"The cost of finishing 11,000 crank plates by hand involves 268 hours at $1.18 per hour for a total of $316.00.

"The cost of finishing the same by Roto-Finish involves 138 hours at 30c per hour or a total of $41.00. The net saving is $275.00."



Unretouched illustration shows crank plate for fishing reel; above, before Roto-Finish deburring and finishing; below, after Roto-Finishing.

Such savings are possible in your finishing department, too! See how Roto-Finish produces a semi-lustrous surface uniformly on one or a thousand pieces; how it handles precision work. Send sample die castings, stampings, machined parts, forgings for processing. Include finished part for guide. No obligation!

THE STURGIS PRODUCTS CO.
409 Jacob St., Sturgis, Michigan

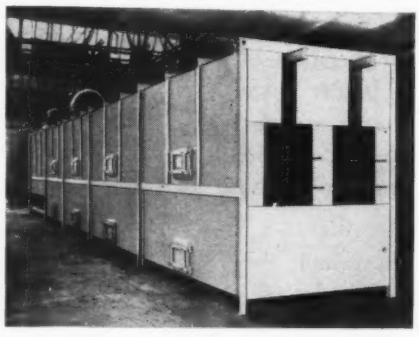
ROTO-FINISH
THE ENGINEERED MECHANICAL FINISHING PROCESS

Equipment & Supplies

E—111. Watertight Thermostat—The Bondee Model K-1 Watertight Thermostat manufactured by Alloy Bellows Engineering Company, 931 Greyton Road, Cleveland 12, Ohio, for use where a close control of temperature is essential and where there is excessive moisture or dust, may be operated safely under water where desired. The metal case is securely soldered to the cast body, and the cement-sealed lead wires make this control completely vapor-, moisture-, and dust-proof. It is constructed to withstand temperatures outside the calibrated range, which may be from subzero to 300° F.

Electrical contacts are snap action with various arrangements (normally closed—opens on temperature rise; normally open—closes on temperature rise, single pole, double throw) and have a capacity of 10amp/125v, 5amp/250v, a-c only. Outlet is standard ½ inch pipe thread. For further information, use Reader Service Card.

E—112. Cleaning and Phosphating Machine—A machine for cleaning and preparing for painting the surfaces of 2 feet wide by 3 feet high sheet metal casings has been developed by The Alvey-Ferguson Company, Dept. P, Cincinnati 9, Ohio. It consists of five fully enclosed

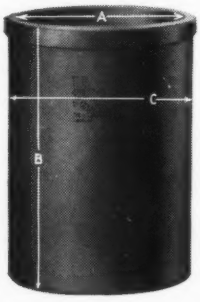


9 feet by 6½ feet wide units totalling 56 feet in length with two parallel overhead conveyors running the entire length and separated by a center partition. Pumps, tanks and other facilities serve both sides for savings in equipment and operating materials. The following steps are performed in a continuous, automatic cycle: two thoro-wash and phosphate coating operations, a clear rinse, a mild chromic acid rinse, and a drying operation. For further information, use Reader Service Card.

E—113. New Polishing Wheel Cement—Extraordinary flexibility and adhesive strength are claimed for a new polishing wheel cement called Wheel King,

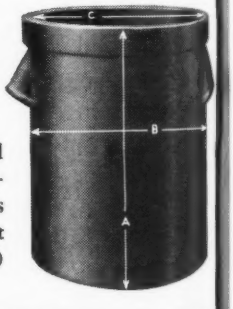
FOR Acid Storage and Mixing "U. S." CHEMICAL STONEWARE Jars, Pots, Tanks

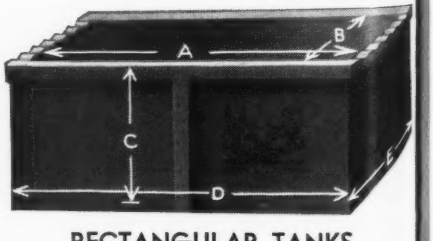
Acid-Alkali-Corrosion-Resistant-all-the-way-through. Dense, non-porous body will not absorb objectionable odors. Smooth, salt-glazed surface does not become slimy. Well-rounded corners make cleaning easy.



CYLINDRICAL POTS
(without handle)
Made in 15 standard sizes from 15 gallons to 500 gallons (with or without outlets, covers, etc.)

CYLINDRICAL JARS
(with handle)
Made in 7 standard sizes from 2½ gallons to 30 gallons (with or without outlets, covers, etc.)





RECTANGULAR TANKS
Made in 14 standard sizes from 4 gallons to 320 gallons (with or without outlets).

• Write for Bulletin 405M •

421 A

U. S. STONEWARE
Akron 9, Ohio

produced by Wallace A. Erickson & Company, 842 N. Wells Street, Chicago 10, Ill.

This material has been sold on a limited basis for a period of several months. Reports from users are said to show much better polishing results and far less tendency to drag or glaze than with hide glue. On a wide range of polishing jobs it is producing from 25 to 60 per cent more pieces per setup than with hide glue on the same work. The reports show highly successful results with 240 and all coarser grains, including use on grease wheels and abrasive belts.

The cement is manufactured in one form only for use with all grain sizes to 240. It is shipped ready-to-use and is applied cold. To a large extent the same consistency is used for all grain sizes. For further information, use Reader Service Card.

E—114. High Temperature Resistant Coatings—Finishes formulated with Dow Corning Silicone Resins have recently been introduced by Midland Industrial Finishes Company, Waukegan, Ill., to supply the industrial demand for coatings which protect metals at temperatures from 500° to 1000° F.

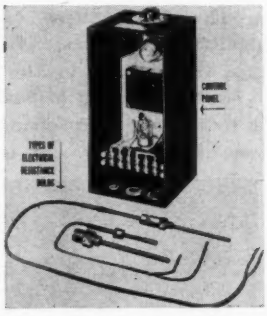
A modified silicone finish pigmented with aluminum is used by one concern to protect two hot metal surfaces in its space heater from oxidation and scaling. In one area, temperatures frequently reach 1000° F. In the other area, the average mean temperature is about 500° F.

Aluminum pigmented coatings made from the better organic resins of similar costs disintegrate after a few weeks of such service. For further information, use Reader Service Card.

E—115. Chemical Cleaner for Aluminum—"Alumatreet", a chemical mixture manufactured by Farrelloy Company, 1245 N. 26th Street, Philadelphia 21, Pa., is said to clean the dirtiest aluminum and simultaneously create an absorptive crystal coat, thereby assuring a tight paint lock, free from blisters and peeling. It is claimed to protect the treated surface so that if paint is actually scratched, it will not permit creeping of the corrosion under adjacent paint, and actually to transform the aluminum surface, which is alkaline, to a non-metallic coating which is essentially acid.

Since it dries by physical action at normal temperatures, it requires no additional heat to evaporate, and it may be used with no surface preparation on bright metal with no after-drying except wiping with a rag to remove excess residue. For further information, use Reader Service Card.

E—116. New Electronic Temperature Controller—A temperature controller, said to be simple, fast, and precise, has been developed by the Instrument Division of Thomas A. Edison, Incorporated, West Orange, N. J. The device uses a single electronic tube with an electrical



resistance type bulb for thermal pick-up and is of the on-off type.

The use of the resistance bulb permits location of the sensing element at a point remote from the control panel and eliminates the necessity of thermal compensation. This device, which is non-indicating, may be used to control temperatures to close tolerances in solids, gases, or liquids. Units are available to cover the temperature range from–100° F to 1200° F and are adjustable within a range of several hundred degrees. Supply voltage may be 115 or 230 volts 50–60 cycle alternating current. Load capacity is 30 amperes at 115 volts, 20 amperes at 230 volts. Accuracy of the controller is independent of usual voltage variation. Normal response time is under three seconds, due to the patented bulb construction. For further information, use Reader Service Card.

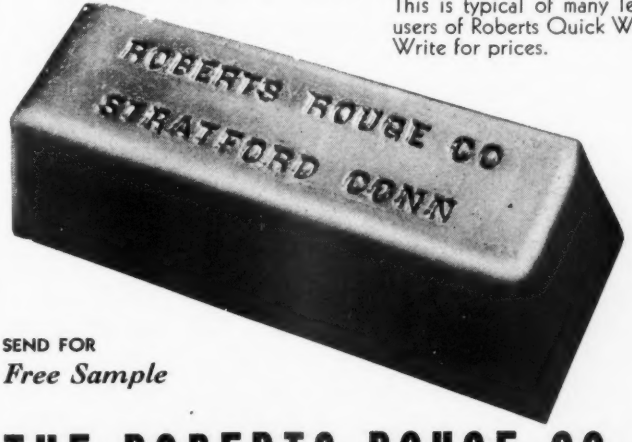
E—117. New Metal Cleaners—Two new metal cleaners, said to be effective individually or in combination for cleaning a wide variety of metal and alloys, have been announced by Calgon, Inc., Pittsburgh, following a long period of laboratory and field research and testing. The announcement marks the official entry of this widely known chemical manufacturer into the metal cleaner field, with products specifically developed for this purpose, although the company's water-conditioning materials are used extensively in industrial cleaning work in connection with the application of other Calgon products.

Calgon Metal Cleaner No. 21 is described as a dry granular alkaline detergent for spray cleaning in metal-washing machines. In addition, it has proved effective when used in combination with the new Calgon Emulsion Cleaner for immersion cleaning in dip tanks and for heavy-duty spray cleaning. Although designed primarily for cleaning of steel products or parts, is said to be well suited for a wide variety of other metals and alloys. It effectively spray cleans aluminum, for example, without etching its surface; in long immersion or dip-type cleaning of aluminum a slight etching may occur. It is said to be excellent as a pre-cleaner when the metal surface is to be phosphate-coated, or otherwise treated, as well as in applications requiring cleaning alone. Effective temperature range for its use is wide, 140° to 180° F.

Calgon Emulsion Cleaner is described as a white, creamy emulsion of an organic solvent in a relatively small amount of water. It readily disperses when added to the cleaning bath. It is especially recommended for use in combined solution with Calgon Metal Cleaner No. 21 for immersion cleaning or especially diffi-

"Your Water Soluble Rouge and Tripoli are going great guns here..."

. . . In my opinion, you have made a tremendous forward step in finishing compounds. This applies not only to the finishing department, but to the poor platers who have to clean the products. At present, we use one barrel a day."
This is typical of many letters received from users of Roberts Quick Washing Compounds. Write for prices.



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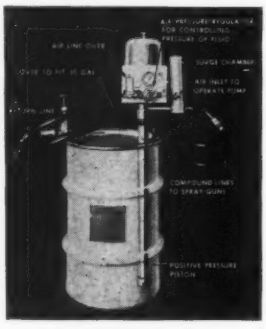
cult spray cleaning. This mixture or combination of the two cleaners is said to provide the advantages of an alkaline cleaner with those of an organic solvent. It is said to be easily rinsed from the metal surface with either hot or cold water, leaving no solvent or other film, important when the cleaning is to be followed by electroplating.

Recommended concentration of Calgon Emulsion Cleaner is 1 ounce per gallon for spray cleaning and 1 to 2 ounces per gallon for immersion cleaning. The temperature range is 140° to 160° F. For further information, use Reader Service Card.

E—118. Nickel and Chromium Plated Aluminum Sheet—The reappearance of nickel and chromium plated aluminum sheet in its line of pre-finished metals after a seven-year absence due to the war is announced by American Nickeloid Company, Peru, Ill., manufacturers of Nickeloid pre-plated metals.

The advantages claimed for pre-plating aluminum with nickel or chromium is that the coatings impart greater resistance to tarnish and make possible soldering of the aluminum, which is not true of the unplated metal. The products are offered in sheets only, in sizes up to 36 inches by 96 inches and in a wide range of tempers and gauges. For further information, use Reader Service Card.

E—119. Pump for Spraying and Agitating Buffing and Polishing Compounds—The J. J. Siefen Company, 5657 Lauderdale, Detroit, Mich., has announced an addition to the "Siefen System" for the spraying of buffing and polishing compounds to revolving wheels to increase its efficiency. It is an air



operated, positive-pressure pump which furnishes compound to the spray gun, circulates it, and returns it to the drum and thus assures sufficient compound at all times to each gun and furnishes a means of mixing the material in the drum.

These pumps have been in operation for a year and are said to be well accepted by the trade. For further information, use Reader Service Card.

E—120. Fume Duct Liner—An acid and alkali proof lining material for fume-carrying ducts is now being offered for general use by the Ceilcote Company of Cleveland which has specialized for 25 years in acid proof materials. The new product, known as Ceilcote Spray Grade, has been under continuous tests for a number of years by several of the country's largest electrical manufacturers with results which make the manufacturing company willing to offer guaranteed performance.

The material is said to be proof against acids and alkalies and have a maximum temperature resistance of 300° F. It bonds to either wood or metal. Application is by special spray equipment which builds a lining up to ⅛ inch thickness, affording expansion and absorption and eliminating cracking from vibration. It is offered on an installed basis or, for those desiring to make their own installation, special spraying equipment is available on a rental basis. For further information, use Reader Service Card.

E—121. Aluminum Surface Treatment—D. C. Cooper Company, 1469 S.

We are pleased to offer from stock

BARREL CHROMIUM PLATING MACHINES

at the price of £850 sterling ex our works

These machines produce large quantities of screws, bolts, nuts, washers, small pressings, etc., with a perfect chrome plate, quickly, cheaply and efficiently without being touched by hand.

PLATING ACCESSORIES & ENGINEERING CO. LTD.

Tudor House, Bridge St., Walsall, Gt. Britain

Equipment and Supplies

Michigan Avenue, Chicago 5, Ill., announces the development of a new product which is known as D. C. Aluminum Etch, for conditioning aluminum surfaces so that paint will adhere..

This product is in liquid form, and is used cold, diluted 50/50 with water. The aluminum parts can be immersed in this solution from 5 to 30 seconds, then rinsed, and the parts are ready for painting. Where the aluminum surfaces are not adaptable to immersion, D. C. Aluminum Etch can be applied with a brush. For further information, use Reader Service Card.

E—122. Hand Cleaner—A new Borax-based powdered hand cleaner, which is said to remove grease, dirt, ink, vegetable dyes, chromic acid stains, and many other contaminants, is offered by the Rossaul Company, 170 Fifth Avenue, New York 10, N. Y.

While highly abrasive, it is claimed to be gentle enough to be used on the body and effectively remove some causes of dermititis Completely soluble in water, it will not clog drains. For a four-ounce sample, use Reader Service Card.

E—123. Plating Waste Disposal—Infilco, Incorporated, 325 W. 25th Place, Chicago 16, Ill., manufacturers of equipment for water treatment, flow control and measurement, offers its services in the selection and design of equipment for cyanide removal, acid neutralization, and precipitation and removal of chromium, nickel and other metals. For further information, use Reader Service Card.

E—124. Nozzle for Dip Tank Fire Protection—Walter Kiddie & Company, Inc., 40 E. 34th Street, New York 16, N. Y., has developed a new "L" type Multi-Jet nozzle, designed for smothering dip tank and drainboard flammable liquid fires with carbon dioxide gas. It is designed to emit fire-killing carbon dioxide in a fan-shaped blanket that hugs the liquid surface in tanks or along drainboards, and is equipped with a mounting flange for easy attachment to the top reinforcing angle with which most tanks are equipped. Depth of the nozzle from front to back is kept at a minimum by the new design (about 4¾ inches for ½-inch supply pipe) to permit installation of inlet piping close to tank sides. Before introduction of the new nozzle carbon dioxide fire protection installations on exposed tanks and drainboards required complicated overhead piping and space-consuming horn type nozzle arrangement that often interfered with dipping conveyors and operators' movements near tanks.

Because of the flat, fan-shaped pattern

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Slightly Used BUFFS

LOOSE AND SEWED

ANY QUANTITY

ALL SIZES

MICHIGAN BUFF CO., INC.

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PLATING ROOM SERVICE

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Take advantage of our practical experience.

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FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 588.

of the carbon dioxide gas discharge put out by the new nozzle, more complete protection of tank liquid surface or drainboards can be achieved with fewer nozzles and less piping. Inspection, maintenance and cleaning are also simplified, it is claimed. For further information, use Reader Service Card.

E—125. Acid Resistant Stainless Steel—An 8-page Bulletin 112 has just been issued by the Duriron Company, Dayton 1, Ohio, on a high-alloy low-carbon austenitic stainless steel known as Durimet 20. Introduced just before the war, this alloy is said to have proved markedly superior to standard 18–8 stainless steel for certain severe corrosive services, especially in the handling of sulfuric acid.

In the cast form Durimet 20 contains 29 per cent nickel, 20 per cent chromium, 1¾ per cent molybdenum, 3½ per cent copper, 1 per cent silicon and 0.07 per cent max. carbon. In the wrought form the copper and silicon contents are modified slightly. It is recommended for use with about 125 corrosive solutions. Its resistance to sulfuric acid and its limitations for this corrosive are thoroughly charted. For your copy, use Reader Service Card.

E—126. Vapor Degreaser—Vapor Engineering Corporation, Los Angeles, announces its new Model AA vapor degreaser which the manufacturers claim was designed to meet demands for a degreaser of simple construction and that would eliminate much of the solvent loss, high operating cost, and service shutdowns of degreasing equipment.

All interior surfaces of the tank, storage chambers, baffles and floor supports that come in contact with fluid are gunmetallized with zinc. The exterior surfaces are coated with solvent resistant metallic paint. Removable floor plates, filter tray and splash baffles are of heavy gauge steel and are hot zinc galvanized. The unit is equipped with a sealed vaporizer that prevents chilling of the boiling solvent by direct return of cold fluid to the surface of the bath.

The firm also produces a Style "E" degreaser, which is an all-electric portable unit of 220–440 volt, 50 cycle; a Style "G", a gas heat, electric controlled unit; and the Style "S", a steam heat, electric controlled unit. For further information use Reader Service Card.

E—127. Fire Extinguishers—American-La France-Foamite Corporation of Elmira, N. Y., is announcing a complete new line of 2½-gallon resistance welded silicon bronze fire extinguishers to replace riveted and copper fabricated units of the same capacity. They are soda-acid; foam; plain water; and anti-freeze water types. Each lighter in weight by 4½ pounds, they are claimed to be much stronger, with greater resistance to accidental blows which could close the passage of ordinary lead nozzles. The transparent plastic nozzle provides clear vision of the passageway. For further information, use Reader Service Card.

E—128. Contact Wheel for Belt Polishing—A new Airway Ventilated Contact Wheel for abrasive belt polishing has been announced by the Jackson Buff Corporation, Long Island City, New York. It has been designed for contour or flat work on stainless or carbon steel stampings, aluminum, brass, die-castings and forgings and is said to offer maximum resilience, yielding readily to pressure and springing back into shape quickly for the next pass. The ventilation feature of these wheels is claimed to make them ideal for all plants where high speed contour polishing of metals, plastics or wood is important.

The contact wheels are available in 6- to 16-inch diameter standard sections of ½ inch face. The width of wheel face can be changed to suit each job. For further information, use Reader Service Card.

INFORMATION SHEET

This information applies only to the specific application outlined for the Permag Compound described below:

PERMAG

FERRO-LYTE

Description of Material

PERMAG for Steel

Method of Use

Send Now for Your PERMAG INFORMATION SHEET

Furnished Free to the Industry

These convenient sheets are provided to facilitate a quick solution to your metal finishing questions that may arise, or where an unfavorable condition exists and special information is requested. We urge you to use this simply arranged form.

For:

Production Control

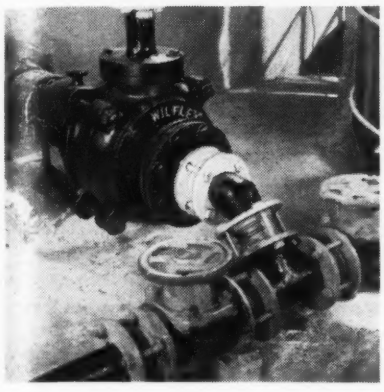
MAGNUSON PRODUCTS CORPORATION

Mfrs. Specialized Cleaning Compounds for Industrial Purposes

Main Office, 50 Court St. BROOKLYN 2, N. Y.

In Canada: Canadian PERMAG Products Ltd., Montreal, Toronto

AVOID COSTLY SHUTDOWNS DUE TO *CORROSION*...



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HAVEG

EQUIPMENT FOR

CORROSION RESISTANCE THAT'S MORE THAN SKIN DEEP

- Agitators
- Baskets
- Blowers
- Fume Duct
- Filters
- Kettles
- Piping
- Pumps
- Tanks
- Towers
- Many Others

HAVEG is a molded structural material that is completely acid and alkali resistant throughout its entire mass . . . it is not a lining nor a coating!

Large size equipment can be molded at low cost in one piece without seams or joints and installation accomplished easily and economically.

Send for Bulletin F-5 for complete design, engineering and application data.

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New Literature

L—88. Solvent Cleaner—How an emulsifiable solvent cleaner, Oakite Composition No. 97, in conjunction with pressure-spray washing equipment, removes grease, oil, chips, shop dirt, etc., from metal parts between production operations, is described in an article appearing in a recent issue of Oakite News Service, house publication of Oakite Products, Inc., 140 Thames Street, New York 6, N. Y. The material is said to have a duplex action in that it (1) quickly wets, penetrates and dissolves oil and grease, and (2) has the ability to lift off the thinned soils and particle dirt, buoying them to the tank surface so that they may be either skimmed or overflowed for disposal. Other particle dirt is so saturated that its attachment to the metal surface is broken and it can, therefore, be easily rinsed away, it is said. Because of the almost neutral pH of Oakite Composition No. 97, it may be used on all metals, including aluminum, without etching or pitting. In extensive tests this material has demonstrated the ability to remove dirt and smut particles from metal surfaces where solvent vapor degreasing has failed, the manufacturer states. For your copy, use Reader Service Card.

L—89. Wet Method Dust Control—A 20-page Bulletin No. 410, released by Claude B. Schneible Company, 2827 Twenty-fifth Street, Detroit 16, Mich., presents a comprehensive line of Multi-Wash equipment for the control and disposal of dust, fumes and odors.

The advantages of the wet method are demonstrated by a cut-a-way view of a Schneible Multi-Wash collector in operation, showing how contamination is thoroughly removed from collected air in a collector which requires no attendance and a very minimum of maintenance.

Other Schneible units illustrated and described include settling and dewatering tanks of various types, "Wearproof" sludge pumps, "Uni-Flo" dust hoods, the Schneible "Velocitrap" for removing heavy and abrasive solids from the air before it reaches the collectors, and entrainment separators for removing excess moisture from air. For your copy, use Reader Service Card.

L—90. A-C Generators—A new 4-page bulletin has been issued by Columbia Electric Manufacturing Company, 4519 Hamilton Avenue, Cleveland 14, Ohio. It describes and illustrates a series of machines of 6¼ to 375 KVA capacity,

PRICED TO SELL!

MOTORS GENERATORS

Reliably Rebuilt

1 YEAR GUARANTEE

6/12 Volts

1—8000/4000 Ampere, H-V-W Synch. M. D. 300 RPM
2—6000/3000 Ampere, B. & O'C. with Chandeysson synch. motor, 450 RPM
2—5000/2500 Ampere, B. & O'C. with Chandeysson synch. motor, 450 RPM
1—5000/2500 Ampere, Columbia, 690 RPM
1—2000/1000 Ampere, H-V-W, 690 RPM
1—1250/625 Ampere, H-V-W, 850 RPM
1—1000/500 Ampere, Chandeysson, 690 RPM
1—1000/500 Ampere, Columbia, 1150 RPM
1—1000/500 Ampere, H-V-W, 1150 RPM
8—125 Ampere Hobart, 6 volts

12/24 Volts

1—1000/500 Ampere, H-V-W synch. M. D. 900 RPM
1—3000/1500 Ampere, Chandeysson Synch. M. D. 400 RPM

10 V. to 60 V. Single Commutator

1—200 Ampere, 11/15 V. Gen. Elec.
1—180 Ampere, 14/18 V. Gen. Elec.
1—200 Ampere, 15 V. Master
1—1000 Ampere, 15 V. Gen. Elec.
1—300 Ampere, 15 V Star
1—800 Ampere, 22/3[illegible] V Gen. Elec.
3—1500 Ampere, 20 V. Elec. Prods.
1—67 Ampere, 24 V. West.
1—600 Ampere, 24 V. Reliance
1—200 Ampere, 25 V. Star
1—1000 Ampere, 25/35 V. Diehl
1—300 Ampere, 25 V. Star
1—175 Ampere, 25 V. Cr. Wh.
1—500 Ampere, 32 V. Columbia
2—100 Ampere, 30 V. Gen. Elec.
1—200 Ampere, 30 V. West.
2—200 Ampere, 32 V. Gen. Elec.
2—1500 Ampere, 32/40 V. Elec. Prods.
1—1000 Ampere, 33 V. Gen. Elec.
2—200 Ampere, 42 V. Gen. Elec.
3—1500 Ampere, 45 V. Century
1—1500 Ampere, 50 V. Gen. Elec.
2—800 Ampere, 50 V. Gen. Elec.
1—400 Ampere, 50 V. Gen. Elec.
6—1500 Ampere, 50 V. Elec. Prods.
1—1000 Ampere, 60 V. Gen. Elec.

L. J. LAND, Inc.

136 GRAND STREET
NEW YORK 13, N. Y.
Established 1910
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New Literature

single and 3-phase, 514 to 1800 rpm. For your copy, use Reader Service Card.

L—91. All-Metal Flexible Tubing—"Titeflex" all-metal flexible tubing is illustrated and described in a 24-page catalog recently published by Titeflex, Inc., 441 Frelinghuysen Avenue, Newark 5, N. J. In addition to Titeflex brass tubing, the catalog describes the company's new bronze tubing for nominal steam pressure applications, monel and stainless steel tubing for higher temperatures and corrosion resistance, and inconel tubing for extremely high temperatures.

Included are specifications for standard fittings and illustrations of typical assemblies with these fittings. The new catalog also describes Titeflex bendable pipe, high frequency conductors, and vibration eliminators. For your copy, use Reader Service Card.

L—92. Nozzles for Mechanical Spraying Systems—Bulletin 14, just issued by the Binks Manufacturing Company, 3114-3140 Carroll Avenue, Chicago 12, Ill., contains much useful information regarding Rotojet nozzles and their application to metal cleaning and treating equipment. They are made from a variety of metals, including cast iron, stainless steel, brass, or any other machinable material obtainable in the form of bar stock to withstand the action of practically any solution in common use. The new bulletin contains diagrams, tables and other mechanical data. For your copy, use Reader Service Card.

L—93. National Electrical Safety Code—The first five parts of the fifth edition of the National Electrical Safety Code, previously issued separately as National Bureau of Standards Handbooks H31 to H35, are now available in one 408-page cloth-bound volume as NBS Handbook H30. Each of these parts has been approved by the American Standards Association as an American Standard.

Installation and maintenance rules for electric utilization equipment are found in Part 3. Part 4 contains safety rules for the operation of electric equipment and lines. An index to all five parts is also provided.

NBS Handbook H30, National Electrical Safety Code, may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at $1.25 per copy.

L—94. Quick Reference Dial of Safety Hazards and Preventatives—The new Davis Safety Aid Dial introduced by David Emergency Equipment Company, Inc., 45 Halleck Street, Newark 4, N. J., manufacturers of safety, gas analysis and gas alarm equipment, is a ready reference and aid to any one connected with safety from the foreman on up to the manager of the safety department.

The operation side of the dial covers: (1) 45 different mechanical operations in industry, (2) suggested head, eye and face protection, (3) body protection for each operation, (4) respiratory protection for each operation. If in any operation, some harmful substance might be used, an indication is given which refers to the other side of the chart where substances are listed.

The substance side lists 55 different fumes, vapors, gases, dusts, etc., and gives the following information about each: (1) probable safe concentration for an 8-hour exposure, (2) suggested protection and control measures, (3) usual method of entrance to the body, (4) flash point, (5) lower explosive limit.

There are in addition a listing of the uses and limits of various types of gas protective equipment. For your copy, use Reader Service Card.

L—95. Emulsion Cleaner—The applications of Houghto-Clean 220 have been laid down in a product data sheet now available from E. F. Houghton & Company of Philadelphia. This cleaner is considered a superior replacement for either straight petroleum solvents or non-flammable solvents used for industrial cleaning. It is said to be equally efficient for cleaning ferrous or non-ferrous metals. It also forms a stable non-foaming emulsion with water, hot or cold.

This product is said to possess higher solvency properties than do straight solvents. It mixes readily with water, is attracted to water in the spray rinse and hence is more thoroughly removed than is a straight solvent which resists water. It contains a powerful corrosion inhibitor, is non-toxic, and does not present a fire hazard. Installations can be conveyorized. For your copy, use Reader Service Card.

L—96. Barrel Deburring for High Production—The deburring and finishing of metal parts in bulk by means of rotary deburring barrels is the subject of literature available from Almco Division of Queen Stove Works, Albert Lea, Minn. For your copy, use Reader Service Card.

L—97. Grinding, Polishing and Deburring Machinery. A new 20-page Catalog No. 325 shows the complete line of grinding, polishing and deburring machinery manufactured by Hammond Machinery Builders, Inc., Dept. GP-10, Kalamazoo 54F, Mich., and discusses their application. Pictures of many products which can be finished on these machines are included. Also shown are light polishing lathes and hard wheel grinders. Of special interest are the many flexible belt units. For your copy, use Reader Service Card.

L—98. Felt Wheels and Bobs—The Bacon Felt Company, Winchester, Mass., has just released a new 16-page brochure covering the company's complete line of felt wheels, bobs, sheets, hair felt, and marble mops. It contains a wealth of information on felt polishing products in general as well as complete specifications for Bacon's Paramount Brand products. Of special interest is a chart of finishing procedures for a variety of base metals and a chapter on felt wheel setup and care.

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Buffing and Polishing
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STAND OUT!

To make your products stand out competitively, specify HARRISON cake or liquid compounds. Their fast cutting and quick cleaning action insure economy of operation.

SPECIAL: Harrison has developed a new dip compound that creates a head on the buff. You get a deeper cut . . . use less compound . . . save!

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1948 CONVENTION NOTES

IF REGISTRATION is any measure of the success of a meeting, the Atlantic City Convention, with over 1,200 registrants, certainly can be counted as a successful affair. The efficiency of the registration desks under Mr. John R. Gumm deserves mention in this connection.

The Technical Sessions

Even better evidence was the attendance at the technical sessions: a very large portion of the men came to each session and stayed through it, with wide-awake attention being given to each speaker.

Not less than twenty papers of excellent quality were presented at five sessions. All of them, including the frequently very illuminating discussions, will be published in a bound volume, the 1948 *Proceedings*, some time after October of this year, or in this journal.

The Industrial Finishing Exposition

Occupying more than 16,000 square feet of actual exhibit space and accommodating eighty-five manufacturers and suppliers to the electroplating, metal finishing and allied industries, the Exposition attracted a selected attendance estimated to be in excess of seven thousand. It was not open to the general public but restricted to those having a direct interest in the industry.

Noteworthy was the large number of exhibits devoted to mechanical finishing: wheel polishing and buffing, abrasive belt polishing, and tumble finishing. It served to illustrate the prevailing consciousness of the importance of base metal finish, both quality and cost-wise, and the continuing trend toward higher efficiency in this field.

Two low-production full-automatic plating machines received much attention. These smaller, low-cost machines are a boon to electroplating shops and manufacturing plants which desire controlled quality and minimum cost but which do not have large enough output to justify the installation of the usual larger size units.

Among the operating exhibits was also a model full-automatic unit actually doing gold plating. This lilliput machine which claims the distinction of being the smallest operating automatic in the world, was the center of much interest and amusement.

Of high interest to visitors were new self-contained fume and dust separators, the former connected to a large chromium plating tank, the latter to a buffing lathe, both in operation. The applications of these units are numerous and both fill definite needs.

New instruments were on display for the measurement of thickness of electrodeposits. The simplicity and high speed of these new methods seem particularly important.

Special mention should also be made of the A. E. S. Research Committee booth, which served to illustrate the importance of the many researches sponsored by this unique organization.

The Research Committee

Three members of the Research Committee had completed their three-year term under the new committee set-up. These men, Dr. William Blum of National Bureau of Standards, Dr. R. M. Wick of Bethlehem Steel Company, and Mr. E. T. Candee of the Lea Manufacturing Company were thanked for their invaluable contributions, and Dr. Blum was elected an Honorary Member in acknowledgment of his long and distinguished service, as reported last month.

Dr. Louis Weisberg, Consultant, New York City, was elected chairman to succeed Dr. Wick, and Dr. R. A. Schaefer of Cleveland Graphite Bronze Company, Vice-Chairman after Mr. Candee. Mr. William Tucker of Eastman Kodak Company became chairman of the Research Directing Sub-committee succeeding Dr. Weisberg. Mr. B. C. Case of Hanson-Van Winkle-Munning Company and Dr. C. F. Gurnham, Consulting Engineer, Hamden, Conn., remain Vice-Chairmen of this sub-committee. A new Vice-Chairman is Dr. W. A. Wesley of The International Nickel Company.

The new members of the Research Committee are Dr. Wesley, Mr. N. E. Promisel of Bureau of Aeronautics, Navy Department, and Mr. H. J. Struckhoff of Lasalco, Inc.

Personal Note

The Convention visitors were very happy to see the General Chairman of the convention, Mr. Horace H. Smith, up and around. Mr. Smith, a Past President of the Society and much beloved by its members, had been seriously ill during a good part of the year. An earlier attempt to take active part in the preparatory work for the convention had nearly met with disaster. Everyone was, therefore, specially gratified with his presence and his address during the banquet on Thursday night.

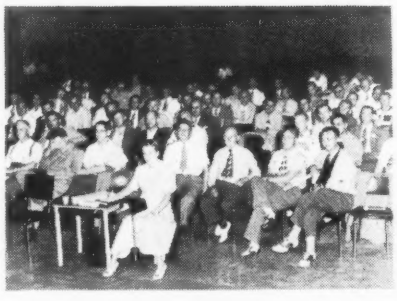
CONVENTION AND EXPOSITION PHOTO-NOTES ON PAGES 850 and 851 ⟶

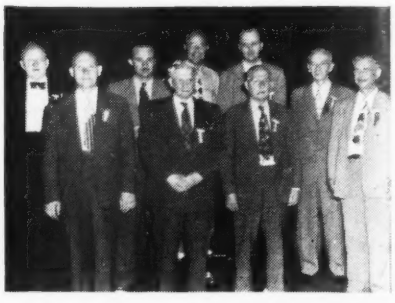
Left: President Huston in action

First Vice-President Johnston presents the budget

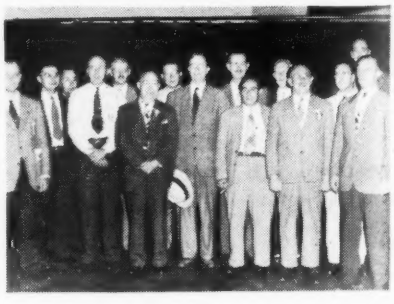
Public Relations Chairman Clarin offers his report

Dr. William Blum acknowledges his election as Honorary Member of the Research Com.





Right: Delegates at Business Session. Far Right: Law Committee; from left to right, front: Past Presidents Huston, Gilbertson, Hogaboom, Smith, and Wagner; back: Feeley, Savage, Slaettry, and Candee.



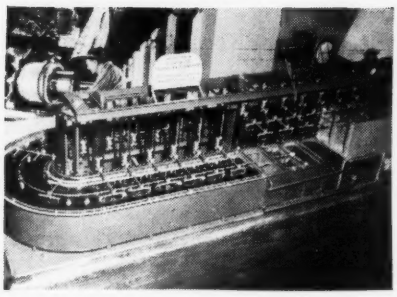
Right: Past President Slattery installs new officers. From left to right: Nixon, Neill, Logozzo, Johnston, Slattery, Huston. Far right: Research group; from left to right: Candee, Schaefer, Bowman, Hahn, Anderson, Weisberg (new Chairman), Read, Wick (retiring Chairman), Mendizza, Thon, Blum, Wesley, Sample, Diggin, Struckhoff.

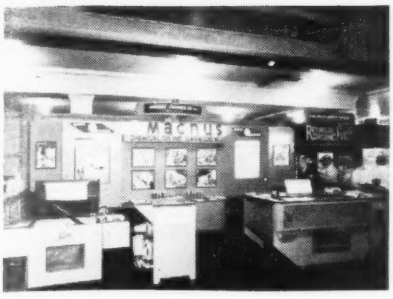
Right: Convention and Exposition top management; from left to right: De Vries, Smith, Wagner. Far right: Van Winlek Todd dominates banquet shot.

Right: New Executive Board; from left to right, seated: Mesdames Huston, Logozzo, and Johnston; standing, Huston, Logozzo, Neill, Johnston, Nixon. Far right: Headquarters staff. From left to right: Miss Gilligan (advertising, PLATING), Mrs. Kinsey (production, PLATING), Misses Curran (secretary) and Adams (bookkeeper); standing: Putnam (Advertising Manager PLATING), Soderberg (Editor, PLATING), Graham (Executive Secretary).

ADVANCE
the MATCHLESS

MANUFACTURIN

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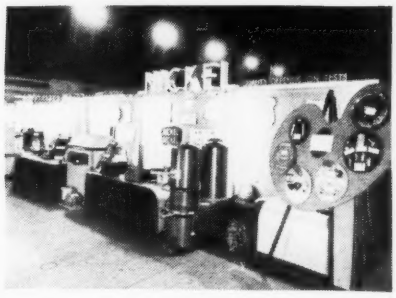

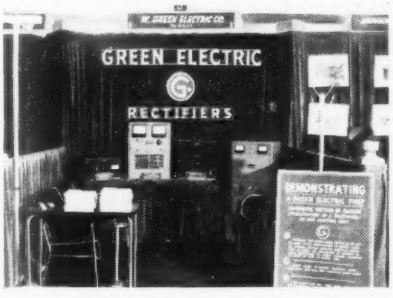
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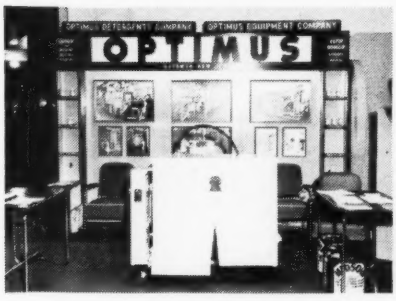
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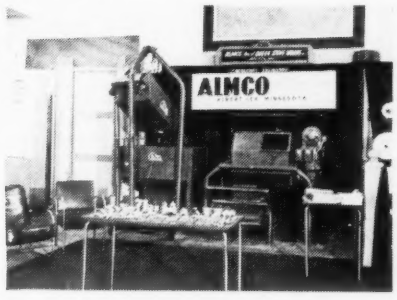
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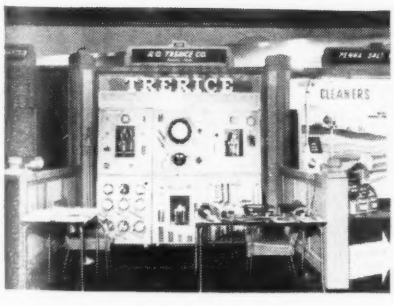
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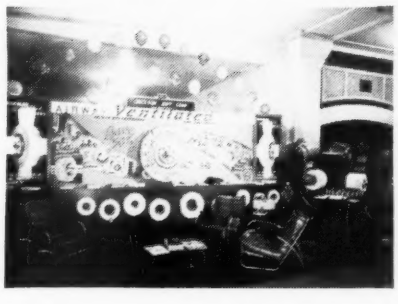
PENN SALT



A.E.S. News

New Branch Library

Another library has been added to the list of libraries available to the public and furnished with copies of Society publication by the local Branch:

Lindgren Library, Massachusetts Institute of Technology, Cambridge, Mass.

THE MONTHLY REVIEW and PLATING, 1923 to date.

Other libraries, not generally available to the public which carry files of the MONTHLY REVIEW and PLATING, are those of the *National Bureau of Standards*, Washington, D. C. (complete), *Electrodepositors Technical Society*, London, England (incomplete), and *University of Notre Dame*, Notre Dame, Indiana (almost complete).

We wish to express thanks to E. Reed Burns Manufacturing Corporation, Brooklyn, N. Y., and to University of Notre Dame for back copies of THE MONTHLY REVIEW. They will find their way into other Branch Libraries.

Two New Branches Granted Temporary Charters

The Executive Board by unanimous vote has granted temporary charters to two new Branches.

The first, the *Winston-Salem Branch*, of Winston-Salem, N. C., is in process of organization, twenty men having signed the requisite petition. MR. R. W. BLACK of Winston Electroplating Company is the Temporary Chairman, MR. MICHAEL MILO of Bassick-Sack Company and the Bridgeport Branch, the Temporary Secretary.

The second, the *Allentown-Reading Branch*, has its headquarters in Allentown, Pa., with some members in Bethlehem, Reading, Easton, and Slatington. Of the twenty persons who signed the petition, nine are members of the Philadelphia Branch but too far removed from Philadelphia to attend many meetings. MR. T. M. RODGERS, President of the Philadelphia Branch, served as Chairman and MR. J. W. MCCURLEY as Secretary at the organization meetings.

The following were elected to office for a period of three months at the meeting on June 17 in the Veterans of Foreign Wars Building, 14th and Hamilton Streets, Allentown:

President—J. W. MCCURLEY
First Vice-President—JAMES PEROTTO
Second Vice-President—FREDERICK E. SNYDER
Secretary—H. E. FENNELL
Treasurer—MR. BAUCH
Librarian—DR. RICHARD M. WICK
Board of Managers—CARL J. SCHWARTZ, H. SCHEARER, L. SEISSMEYER

They were installed by MR. GUSTAF SODERBERG, Editor of PLATING, acting for the Executive Secretary, Dr. A. Kenneth Graham. He also expressed the thanks of the Society to Mr. Rodgers for his work in getting the new Branch started. A total of thirty-five persons had paid their initiation fee or decided to obtain transfer from the Philadelphia Branch at the close of the meeting. They will meet on the third Thursday of the month.

Our best wishes go to the new Branch.

Electrochemical Society Appoints Research Committee Liaison

DR. LOUIS WEISBERG, the new chairman of the Research Committee of the American Electroplaters' Society, has announced that DR. H. JERMAIN CREIGHTON, Professor of Chemistry at Swarthmore College, Swarthmore, Pa., has been appointed to represent the Electrochemical Society on the Research Committee.

Dr. Creighton, a former president of the Electrochemical Society and a recent recipient of an honorary LL.D. degree from Dalhousie University, Halifax, Nova Scotia, brings to the Committee wide experience in electrochemical research. The Research Committee extends to him a warm welcome.

Sustaining Members

The number of sustaining members at the end of the fiscal year 1947–1948 was 226, a net increase of three during the year. Of these, 146 or 64.7 per cent are manufacturers with plating departments, an entirely too low percentage considering the benefits they receive.

Crack Down on Overhead with Williamsville Buffs

Are all metal finishing needs alike? Not by a long shot! That's why Williamsville buffs and wheels are job-tailored to your particular needs in coloring, cutting, and polishing. They run cool, save compounds, won't ravel, and give the kind of wear that makes cost-conscious management smile with satisfaction.

And no wonder — because Williamsville buffs are made of the highest quality sheeting, carefully cut, turned, stitched, and trimmed. To metal finishers with a weather-eye on competition we offer savings in overhead costs through better buffing. The proof? Consult us now about your requirements. Write, wire, or phone.

WILLIAMSVILLE BUFF DIVISION
The Bullard Clark Company
DANIELSON, CONNECTICUT

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 593.

Branch News

BRIDGEPORT BRANCH

The signing of two new sustaining members was one of the accomplishments reported at the meeting on May 7.

One new application for membership was received and one applicant elected. Two members were transferred-in from the New Haven Branch and one suspended.

No meetings will be held in July or August, but an outing will be held in August, chairmanned by WILLIAM EHRENCRONA.

The following committees were appointed by PRESIDENT CHARLES L. TEMPLE:

Sick Committee—FRED B. GOTTHARDT, Chairman; EUGENE PHILLIPS, HERMAN C. BRAUN

Membership Committee—CARL SCHAEFER, Chairman; ANTHONY J. CHENIS, FRED B. GOTTHARDT, EUGENE PHILLIPS

Entertainment Committee—WILLIAM EHRENCRONA, Chairman; ARTHUR R. MCNEIL, EUGENE PHILLIPS

Publicity Committee — GEORGE WAGSTAFF, Chairman; ARTHUR R. MCNEIL, JOSEPH J. STERLING

Projector Committee—ARTHUR R. MCNEIL, Chairman; RICHARD C. BARRETT, WILLIAM A. EHRENCRONA, RAYMOND GORAL

Educational Committee — ARTHUR R. MCNEIL, Chairman

LIBRARIAN CHENIS then conducted a short technical session.

JOSEPH G. STERLING, *Secretary-Treasurer.*

BRIDGEPORT BRANCH

Sixty members and guests heard MR. RAYMOND J. KWASNIK, founder of Aristol Company, Fairfield, Conn., and a member of the Branch, discuss "Anodizing of Aluminum and Its Alloys" at the open meeting on May 21.

Three processes, the oxalic, sulphuric and chromic acid processes, were described in detail as were dyeing methods. Among conditions for good results were cited good cleaning and removal of oxide films, ample current capacity, and efficient ventilation. An actual demonstration of anodizing was made and samples were passed around for inspection.

JOSEPH G. STERLING, *Secretary-Treasurer.*

BUFFALO BRANCH

The following offiflers have been elected to serve during the year 1948-1949:

President—DR. C. J. WERNLUND

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Twenty authoritative chapters in simple language on the properties of solutions, Faraday's Laws, pH, electrode potentials, overvoltage, polarization, anode behavior, corrosion, etc. Successfully used for classroom instruction.

Proceedings of the American Electroplaters' Society Vol. 33, 1946. Price $6.50.

Twenty-one papers on copper, nickel, rhodium and tin plating; plating of strip and wire screen cloth; electrocleaning and electropolishing; magnesium treatment and parkerizing; polishing and buffing; organic coatings, etc. A. E. S. Research Annual Reports.

Proceedings of the American Electroplaters' Society Vol. 34, 1947. Price $10.00.

Fourteen papers and eight A. E. S. Research Annual Reports on barrel plating of nickel and chromium; brass, cobalt and nickel plating; zinc treatments; electroforming; buffing; physical properties of and stress in electrodeposits; plating room waste disposal; health hazards.

"Specifications and Tests for Electrodeposited Metallic Coatings" sponsored by American Society for Testing Materials and American Electroplaters' Society. Price $1.25.

Specifications for zinc, cadmium, lead, and copper-nickel-chromium coatings on steel, copper-nickel-chromium coatings on brass and zinc base die castings, and chromate finishes on steel; methods for tests; and recommended practical for hard chromium plating and for preparing low-carbon steel for plating.

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Second Vice-President—ANTHONY NIGRO
Secretary—H. A. FUDEMAN
Treasurer—F. S. NOWAKOWSKI
Sergeant-at-Arms—LEONARD MILLER
Librarian—ROGER SHELDON
Board of Managers—SIEBERT JOHNSON, JOE RUFF, LEON NOWAK

The Educational Session Committee plans to meet regularly through the summer to consolidate plans for an early fall meeting. The Picnic Committee will also complete its plans and announce them later. H. A. FUDEMAN, *Secretary.*

DETROIT BRANCH

The May, and last, meeting of the 1947–1948 season was held at the Hotel Statler on the 7th.

Officers for the 1948–1949 year were installed by WILLIAM PHILLIPS who charged them with their duties in a rather impressive ceremony.

Mr. Phillips, who is Head of the Electrochemistry Section of General Motors Research Laboratories, was also the speaker of the evening and presented a very fine talk and demonstration on plastics. He not only covered the wide variety of plastics in a general way but also with particular reference to the plating industry. A small molding press had been set up and test samples prepared for the members' examination. Demonstrations were also made to show outstanding physical properties of several of the more important plastics.

The motion picture of the evening was a color picture of last season's Rose Bowl game between University of Southern California and the University of Michigan. We were very fortunate in having MR. WALLY WEBER of the University of Michigan Coaching Staff give his unique commentary on the game.

The retiring President, WRIGHT WILSON, reviewed the growth of the Branch during the past years and gave brief reports on the various activities. C. F. NIXON, the newly elected President, told of plans for future events.

R. H. DUDLEY, *Publicity Chairman.*

HARTFORD BRANCH

Approximately one hundred members and guests attended the "Information Please" meeting on May 17. One new member was elected, and one transferred to Detroit Branch.

An experienced panel of practical men was on hand to answer questions on bright nickel and chromium plating and on polishing: J. J. LOOMEY, ART LOGOZZO, E. COUTURE, RALPH COULTER, HAROLD COURNEY and A. ROSENTHAL. They provided an interesting program.

Two films, *Atomic Energy* and *Atomic Power*, were shown and very much enjoyed by those present.

Refreshments were served at the close of the meeting.

RALPH D. CHASE, *Secretary.*

LANCASTER BRANCH

Fifty-three members and guests met at the offices of the Hanover Wire Cloth Company, Hanover, Pa., on Friday, May 14, for a tour of the plant. Here we saw insect wire screening being made from the beginning to the finished product. Heavy wire of about ¼ or ⅜ inch diameter is drawn through several machines until it is fine enough for the manufacture of the wire cloth. This wire is wound on small spools and taken to a room where they are put on racks and run off on a large roll. This wire is now ready to be woven into wire cloth. The finished wire cloth is again put on large rolls and taken to the plating room. Here they are mounted on one end of large automatic plating units. The screen is cleaned, rinsed, acid dipped, rinsed, nickel or zinc plated, rinsed and dried, and again put on large rolls. These are then taken to the shipping department.

After the tour, we drove several miles outside of Hanover to the Lake Club, where the Hanover Wire Cloth Company had arranged a delicious steak dinner for us. It was followed by a business meeting at which one application for membership was approved and new officers elected as follows:

President—CHARLES E. SNYDER
Vuce-President—LESTER WAGNER
Secretary-Treasurer—CLESTER W. SMITH
Librarian—LE ROY H. HAINS
Board of Managers—JOSEPH MASEK, WILLIAM KLUNK, JOHN REYNOLDS

The new president announced that there would not be a meeting in June, but that a picnic would be held at his home some time this summer.

Before the meeting adjourned, a rising vote of thanks was given to MR. E. B. FROCK, Vice-President of the Hanover Wire Cloth Company, and MR. EDWARD BEMILLER, who is in charge of plating in the wire cloth plant, for arranging the tour and the dinner.

H. CLAY BRUBAKER, *Secretary.*

LOS ANGELES BRANCH

The May meeting was held at Scully's Restaurant on the 12th.

EARL COFFIN inducted the following new officers:

President—FRANK BUNKER
First Vice-President—ALAN SULZINGER
Second Vice-President—JOHN MILLHORN
Secretary—GEORGE M. KENT
Treasurer—ROY B. LOSTUTTER, JR.
Librarian—ED. GEORGE
Board of Managers—HOWARD WOODWARD, Chairman; D. N. ELDRED, DON BEDWELL

After incoming President Frank Bunker had appointed GILBERT BISHOP Sergeant-at-Arms, outgoing President Howard Woodward was presented with a pen and pencil set and a Past President's pin by the Branch.

The Branch voted to become a mem-

ber of the Technical Societies Council of Southern California.

President Bunker appointed the following committees:

Research: LEO ATIMON, JOHN F. BEALL, R. J. WOOLEY, HOWARD WOODWARD and DON BEDWELL

Banquet: HOWARD WOODWARD, Chairman

Publicity: J. T. P. MACDONALD and ED WELLS

The death of MRS. ALEX. REGMUNT was reported; Mr. Regmunt is a longtime member of the Los Angeles Branch.

Speaker of the evening was MR. RICHARD P. CRANE of the Lea Manufacturing Company, who spoke on "Finishing as I Find It".

The following questions were found in the Question Box:

Q. How do I plate over chromium?
A. Try a nickel chloride strike.

Q. How can I separate copper from a chromium mandrel? It adheres too well.
A. None.

GEORGE M. KENT *Secretary.*

LOUISVILLE BRANCH

The May 19 meeting was held in the Speed Scientific Building, University of Louisville. It was attended by Mr. Ed. Bruck, President of the Indianapolis Branch, who wished us well in our venture.

PRESIDENT DONALD PATRICK introduced as the guest speaker, DR. D. GARDNER FOULKE of the Hanson-Van Winkle-Munning Company who presented information about the anodic treatment of magnesium alloys for corrosion protection, paint adhesion, and coloring (dyeing). He predicted that, although aircraft producers are the only large consumers of magnesium alloys today, the use of magnesium alloys by other consumers will increase more rapidly than did the use of aluminum following World War I. Color slides illustrated the finishes and the protection imparted to the various magnesium alloys by AC and DC treatment. An informal discussion brought authoritative answers to questions posed by the members.

STANLEY J. BEYER,
Secretary-Treasurer.

MELBOURNE BRANCH

The 33rd Regular Meeting was held in the Victorian Chamber of Manufactures on May 24 with thirty-five members and visitors present.

Seven new members were admitted to membership and one resignation was accepted. The Secretary gave a resume of the discussion at the Committee Meeting held the same afternoon.

At the conclusion of the business session LIBRARIAN HUGH TEAGUE introduced MR. ROD POWER of the State Film Centre who proceeded with great efficiency to present a short program of tech-

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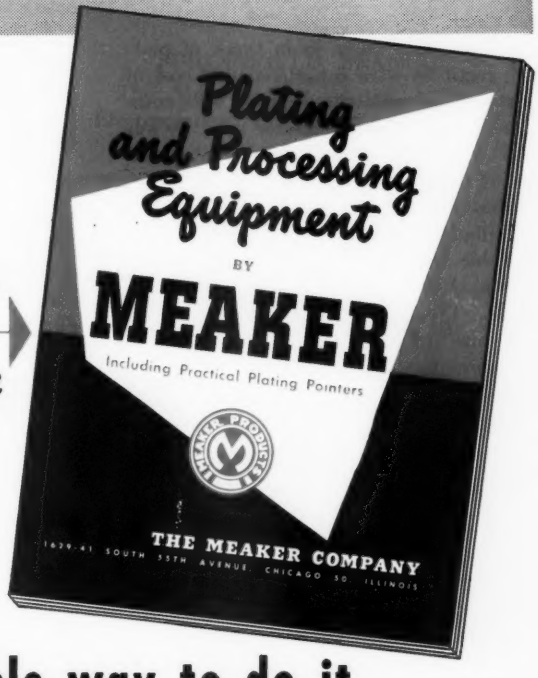

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nological films. Subjects chosen included Chemical Engineering, Colloids, Atomic Power, Construction of a Railway Engine, and Road Making.

CHAIRMAN WALKER'S vote of thanks was warmly seconded by COMMITTEEMAN KEITH LEIGH.

JOHN J. DALE, *Honorary Secretary.*

MONTREAL BRANCH

Twenty-nine members and guests were present at the regular monthly meeting on May 4, among them MR. E. BLANDY, President of the Toronto Branch, to whom a special welcome was extended.

The speaker of the evening, MR. E. REDLHAMMER of Bart-Messing Corporation, Buffalo, N. Y., presented a very thorough discussion of "Rectifiers vs. Generators". Three main types of plating rectifiers were considered and cost of installation, maintenance, etc., were compared with that of generator sets. It was the contention of the speaker that the life of the rectifier equalled the life of the generator and that for certain types of installations rectifiers were the more suitable.

MR. J. FEELEY installed the new officers. Two new members were elected and one application was accepted. The delegates to the coming Convention were elected.

B. MENDELS, *Secretary.*

MONTREAL BRANCH

The Montreal Branch held its regular meeting in the Mount Royal Hotel on June 1 with twenty-four members and guests present.

The speaker for the evening was MR. ED. WALLACE, member of the Branch, who delivered a very interesting talk on "Electroplating of Costume Jewelry." Following a brief history of jewelry, he presented methods and processes of electroplating. Articles of brass and copper stampings are, in order, soldered, pickled, acid dipped and burnished, and then given a bright copper flash and cold rinse. They are given a 5 to 15 minute nickel plate, rinsed thoroughly, and then gold or silver flashed as the case may be. The articles are finally burnished and clear lacquered.

One new member was elected and two applications accepted. A committee was elected to handle the annual banquet in the Fall. The next meeting will be held on September 14.

B. MANDALE, *Secretary-Treasurer.*

NEWARK BRANCH

The Newark Branch held a meeting on May 7 with fifty people in attendance. THOMAS HADDOW installed the new officers who had been elected at the last meeting. One membership application was received, and four applicants were elected to membership.

The following were elected Delegates: HORACE SMITH, GEORGE WAGNER and PAUL OLDAM. Alternates are ZACHARY IRENAS, HOWARD COBB, and JOHN DE VRIES.

The new Librarian, EDWIN BOWERMAN, introduced Mr. Paul Oldam, one of the most active and wittiest members of this Branch, who reviewed formulas, purification procedures, and operating conditions relating to gold plating. Many questions were asked following his excellent presentation.

SAMUEL S. FREY, *Recording Secretary.*

NEWARK BRANCH

Forty-five people attended the meeting on May 21 at which one application for membership was received and one new member was elected.

Following reports from several Convention Committees, MR. FAINT appealed for back numbers of THE MONTHLY REVIEW for libraries throughout the county.

LIBRARIAN ED. BOWERMAN introduced MR. A. HOWE, Finishing Engineer with General Electric Company, who spoke on the subject, "Teaching Fundamentals of Plating to the Beginner". Without the use of modern theories of electrochemistry but with plenty of chalk and ample blackboard space, he demonstrated how it is possible to teach the concepts of electrical pressure (volt), quantity of electrical flow (ampere), current efficiency, conductivity, throwing power, etc., by analogies with flow in a closed system, etc. Numerous ideas and comments were offered after the presentation.

S. S. FREY, *Recording Secretary*

NEW HAVEN BRANCH

MR. PAUL O. BLACKMORE, Technical Manager, Finishes Division, Interchemical Corporation, spoke interestingly about "The Story of Color" at the meeting on April 13.

The following members were appointed to act as a Nominating Committee: JOHN M. BARRY, Chairman; JOHN W. ENGLISH, HENRY L. KELLNER, WALTER T. LYNCH, AL. ROSENTHAL, and CLARENCE GARNER.

B. J. GAFFNEY, *Secretary-Treasurer.*

PHILADELPHIA BRANCH

MR. L. W. BURTON, Commercial Engineer of the General Electric Company, spoke about copper oxide rectifiers to the thirty-five members who attended the meeting on May 21. In his talk he paid particular attention to the current and voltage overload characteristics, precautions to be observed in installation, and maintenance measures to assure proper performance. Slides showing various installations and a motion picture on the manufacturing of rectifier stacks were included.

Five applications for membership, of which one was for membership at large, were elected to active membership.

The Secretary, as Chairman of the Constitution Revision Review Committee, reported the committee's recommendations. A motion was passed accepting the report and instructing the Delegates to be guided accordingly.

PRESIDENT RODGERS announced the appointment of the following committee chairmen:

Membership Committee—SECOND VICE-PRESIDENT GEORGE GIBBS

Attendance and Educational Committee—FIRST VICE-PRESIDENT SAMUEL HEIMAN

Editor of the Quaker City Reminder—JOSEPH J. DUFFY, JR.

It was decided to proceed with plans for an educational session and banquet, with President Rodgers as General Chairman.

I. WM. MARCOVITCH, *Secretary.*

PITTSBURGH BRANCH

A regular meeting was held on May 13 with PRESIDENT W. J. HENNESSY presiding. Following the presentation of the Annual Reports of the various committees, the newly elected officers for the year 1948–1949 were installed:

President—JOHN P. COROS

First Vice-President—ARTHUR KAUPE

Second Vice-President—REGIS J. GOLDBACK

Secretary-Treasurer—GLADE B. BOWMAN

Librarian—E. J. SMITH

Board of Managers (three-year term)—W. J. HENNESSY

The committees for the year 1948–1949 were appointed by the President.

The speaker for the evening, MR. FRANK SAVAGE, Past President of the A. E. S. and Vice-President of Standard Plating Rack Company, Chicago, Ill., was introduced by LIBRARIAN GOLDBACK and gave a resume of the work of the Society. He then delivered an interesting paper on the manufacture of plating racks.

GLADE B. BOWMAN, *Secretary-Treasurer.*

PROVIDENCE-ATTLEBORO

MR. O. A. STOCKER of Seymour Manufacturing Company spoke about "Nickel Plating" at the May 17 meeting. After a brief survey of the history of nickel plating he discussed at some length the formulations in common use during the last twenty years, including baths for electroforming and baths for plating directly on zinc, as well as the increase in concentration to the present 10 oz/gal metallic nickel. Although, according to the speaker, organic brighteners cannot be used in the all-chloride bath, the addition of a 3 to 5 oz/gal sulfate to this bath will permit the economical use of some of the organic brighteners. Specification bright plating in barrels in the newer bright nickels is in large production at the rate of 0.0004 inch per hour. Bright nickel deposits are very active chemically, and problems of subsequent misplating include

prevention of the formation of films on nickel.

As a small token of the Branch's appreciation for his excellent service during the past year, PRESIDENT P. LONSBURY was presented with a rhodium coated Past President's pin.

The Delegates were instructed to vote for the revised constitution.

EDWARD A. PARKER, *Secretary.*

ROCHESTER BRANCH

The night of May 20 was set aside for a visit to Rochester Products Division of General Motors for the purpose of seeing the plant and the finishing operations there. The fifty members who came were impressed by the cleanliness, efficiency and modernity of this large plant, and grateful for the opportunity. After the tour of inspection the Branch was given a large room for its meeting.

FRED WAGNER presented the treasurer's report for the April Regional Meeting at which 268 meals were served and an estimated 300 or more persons were in attendance. We wish to thank the suppliers for their hospitality, PRESIDENT FLINT and the members of his committee, and especially JOHN ADAMS who, as head of the Entertainment Committee, did such a grand job providing the floor show and orchestra. We are also grateful to MESSRS. HUSTON, PINNER, FOULKE, and VANKERVIS for presenting such fine papers.

A letter from MR. LOGOZZO was read announcing that we had won the membership contest for 1947–1948 with 11.7 per cent increase in membership. V. GARTLAND expressed his and the members' appreciation for the spirit of cooperation and the enthusiasm of the officers which made the award possible. We intend to do our best to repeat this record next year.

The members extend their sympathy to MRS. R. H. WALKER and family upon the death of R. H. WALKER of Mt. Morris, N. Y., a member of the Branch. Four men were elected to membership.

The Delegates to the convention are: FRANK TINDALE, WALTER SWANTON, and CHARLES HENDERSHOTT with JAMES WEAVER, WILLIAM TUCKER, and JOHN ADAMS as alternates.

JAMES WEAVER, *Secretary.*

SAN FRANCISCO BRANCH

The regular meeting of San Francisco Branch was held at El Curtola Restaurant, 510 Seventeenth Street, Oakland, Calif., on May 13. Fifteen members attended.

Elections for the year 1948–1949 were held with the following results:

President—JACK HITE
Vice-President—FRED W. HUNTUNGTON
Board of Managers—HUGH MORGAN, LOUIS DELAMOTHE, FRED W. HUNTINGTON

Following the short business meeting, a very interesting discussion took place concerning electropolishing of stainless steel and periodic reverse current plating.

JACK HITE, *Secretary-Treasurer.*

SOUTHEASTERN BRANCH

The May 13 meeting at the Robert Fulton Hotel was attended by seventeen members.

It was decided not to have any regular meetings during July and August; instead there will be a party night for wives and girl friends during one of these months. FRED FLETCHER, ALVIN CHRISTIAN, and VICTOR BARAN were appointed to serve on a committee to make arrangements and report in the near future.

The speaker of the evening was MR. FRANK KING of the Mine Safety Appliance Company who discussed "Safety in the Plating Room". His talk was enjoyed by all present.

WM. T. WEYMOUTH, *Secretary-Treasurer.*

SOUTHEASTERN BRANCH

The June meeting was held the 10th in Robert Fulton Hotel with sixteen members present. Arrangements for the Annual Outing were discussed, and it was decided to hold it during the month of August.

MR. H. D. METHENY of General Electric Company spoke about "Rectifiers for Electroplating" and showed pictures illustrating the manufacture of his product.

The Delegates to the coming convention received instructions. A suggestion that at least one meeting be held in Jacksonville, Fla., during the coming year met with favorable response.

WILLIAM T. WEYMOUTH,
Secretary-Treasurer.

SPRINGFIELD BRANCH

The May meeting of the American Electroplaters' Society was held May 24,

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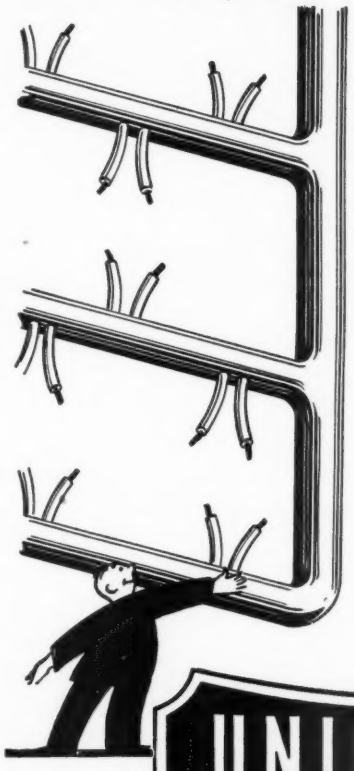

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1948 at the Hotel Charles, Springfield, Mass.

The following officers were elected for the year and installed by JOHN COSTIGAN.

President—CARL BUTLER
First Vice-President—LAWRENCE FOUNTAIN
Second Vice-President—EDWARD DUPURIS
Secretary—HAROLD OEHLER
Treasurer—HAROLD MONGEAU
Librarian—JOHN HORRIGAN
Directors—JAMES LAING, PHILIP PROUTY, NORMAN PLANK, ARTHUR COPP, ERNEST COUTURE

Three new members were accepted into the Branch.

LIBRARIAN JOHN HORRIGAN introduced Mr. HAROLD NARCUS of Electrochemical Industries, Inc., Leominster, Mass., as guest speaker of the evening. His subject, "The Cupron Process", dealt with deposition of reduced copper films on plastics and was illustrated with slides. Judging from the large number of questions which followed, active interest was shown in the subject.

HAROLD OEHLER, *Secretary*.

SYDNEY BRANCH

Thirty-six members and visitors attended the meeting in Shell Theatrette on May 18. Ten new members were elected and further business was curtailed to permit the showing of numerous films which accompanied the lecture by MR. BARNETT of the Australian Aluminum Company.

Mr. Barnett's talk dealt with the manufacture of aluminum and its applications in the numerous fields of metal finishing. A display of aluminum ware was handed around after the lecture for examination after which the films were shown.

JOHN GODFREY, *Secretary*.

SYRACUSE BRANCH

The annual dinner was held on May 24 in Fayetteville, N. Y.

It was decided to change the regular meeting night to the fourth Monday of each month, to drop the practice of a regular dinner before each meeting, to accept an invitation to visit the General Electric Company's Electronics Park plant in September, to hold the Northeastern Regional Meeting here next spring, to drop all delinquent members not paid up by August, and to instruct Delegate CAVANAUGH to nominate GEORGE SIMMONS to Honorary Membership in the Society.

Delegates to the Atlantic City Convention were appointed as follows: MAURICE BALABAN, VINCENT MCCONNELL, and GEORGE CAVANAUGH. HENRY HOLBERT, HERBERT GERHARDT, and MATHIAS BOLAND are alternates.

The Election Committee announced the results of the balloting for officers for the coming year as follows:

President—GEORGE SIMMONS
First Vice-President—HERBERT GERHARDT
Second Vice-President—LINDLEY WOOD
Secretary-Treasurer—VINCENT MCCONNELL
Librarian—GEORGE LAWRENCE
Board of Managers—WILLIAM LANGENMAYR, FRANK QUACKENBUSH, NEIL MAFFEI

Eight men were elected to membership. DR. F. C. JELEN presented a short, humorous paper. The attendance was thirty.

M. P. BOLAND, *Retiring Secretary*.

TWIN CITY BRANCH

The election of officers for 1948–1949, held at the meeting on May 3, gave the following results:

President—DR. FRANK IRELAND
First Vice-President—C. A. BOWMAN
Second Vice-President—AL JOYNER
Secretary-Treasurer—ROBERT L. BUCKLEY

DR. FRANK IRELAND and BEN J. ROSENTHAL, Convention Display Co-Chairmen, reported that each member would be contacted for their part in the display. A report on the coming Annual Party to be held June 7 was given by HALLICK B. JOHNSON.

MR. M. MAHER, of Oakite Products, Inc., gave an informative talk on "The Coloring of Aluminum and Its Alloys" to the thirty-five members and guests present.

ROBERT L. BUCKLEY, *Secretary*.

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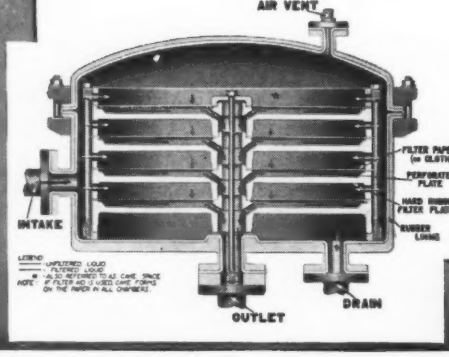

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Membership Report

of the American Electroplaters' Society

Elections

BOSTON BRANCH: William P. Corryn

BRIDGEPORT BRANCH: Charles De Siena, John S. Foyto, Louis Iodice, Arthur S. Lamson, Jr., Hugh A. Stier

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MONTREAL BRANCH: Jean Monette

NEWARK BRANCH: John D. Hayes, Burton B. Knapp, Thomas L. Renart, Jr., Stephen Wray, Jr., James Zemba

TWIN CITY BRANCH: Roy J. Bierman, W. A. Huntley

WATERBURY BRANCH: Frank Tirendi

Transfers

Leonard E. Weeg from St. Joseph Valley Branch

Correction: W. A. Wojmarowski (W. A. Warner), reported as an out-transfer from the Chicago Branch, April issue. Still a member of the Chicago Branch.

Resignations

BALTIMORE-WASHINGTON BRANCH: Gene Kellogg

BRIDGEPORT BRANCH: Lloyd E. Barnes, Wilson Crawford, Jr.

BUFFALO BRANCH: Alma Briggs

CHICAGO BRANCH: J. S. Papierz

NEWARK BRANCH: Henry J. Graff, Emerson E. Dale, Theo Whitlock, Jr., William Zeus

ROCHESTER BRANCH: Jack Snyder

TWIN CITY BRANCH: Frank Nelson

Suspensions

CHICAGO BRANCH: S. W. de Koven

WATERBURY BRANCH: Lloyd L. Gough

Death

MILWAUKEE BRANCH: John Andryski

*These figures are taken from the Annual Report and are subject to corrections as further information becomes available and checked.

BRANCH	Membership May 1, 1948*	New Members	Net Change in Membership	Per Cent Net Change
FIRST GROUP				
CLEVELAND	190	10	+10	+ 5.3
TORONTO	143	5	+ 6	+ 4.2
BRIDGEPORT	154	6	+ 4	+ 2.6
BOSTON	163	3	+ 3	+ 1.8
DETROIT	399	6	+ 6	+ 1.5
PHILADELPHIA	205	2	+ 2	+ 1.0
WATERBURY	128	2	+ ½	+ 0.4
NEWARK	273	5	+ 1	+ 0.4
LOS ANGELES	234	..	.....	.....
NEW YORK	270	1	.....	.....
GRAND RAPIDS	140	..	− 2½	− 1.8
CHICAGO	453	8	−10	− 2.2
PITTSBURGH	149	..	− 8	− 5.4
HARTFORD	152	..	−19½	−12.8
SECOND GROUP				
SYDNEY	91	9	+10	+11.0
BUFFALO	96	4	+ 3½	+ 3.6
MILWAUKEE	120	6	+ 3½	+ 2.9
PROV.-ATTLEBORO	117	3	+ 2	+ 1.7
TWIN CITY	77	2	+ 1	+ 1.3
ROCHESTER	120	2	+ ½	+ 0.4
SAN FRANCISCO	77	..	.....	.....
DAYTON	90	..	.....	.....
INDIANAPOLIS	103	..	.....	.....
ST. LOUIS	103	..	.....	.....
NEW HAVEN	110	..	.....	.....
ST. JOSEPH VALLEY	98	..	− ½	− 0.5
CINCINNATI	80	..	− ½	− 0.6
BALTIMORE-WASH.	97	..	− 2½	− 2.6
THIRD GROUP				
SAGINAW VALLEY	38	3	+ 5½	+14.5
LOUISVILLE	18	2	+ 2	+11.1
MELBOURNE	67	7	+ 7	+10.4
ADELAIDE	66	9	+ 6	+ 9.1
MONTREAL	63	3	+ 3½	+ 5.6
LANCASTER	46	1	+ 1	+ 2.2
TOLEDO	73	..	+ ½	+ 0.7
COLUMBUS	38	..	.....	.....
SPRINGFIELD	53	..	.....	.....
ROCKFORD	59	..	.....	.....
JACKSON-LANSING	64	..	.....	.....
SYRACUSE	66	..	− 1	− 1.5
SOUTHEASTERN	49	1	− 3	− 6.1
OTHERS	113	1	.....	.....
TOTAL A. E. S.	5,249	102	+32	+ 0.6

Active Membership, July 5, 1948 5,281

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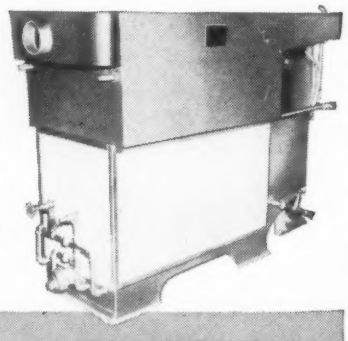

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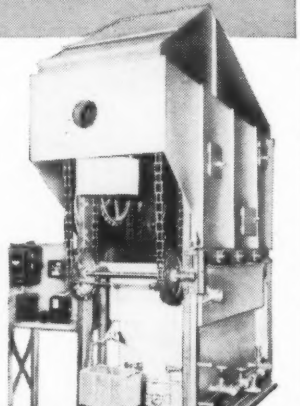

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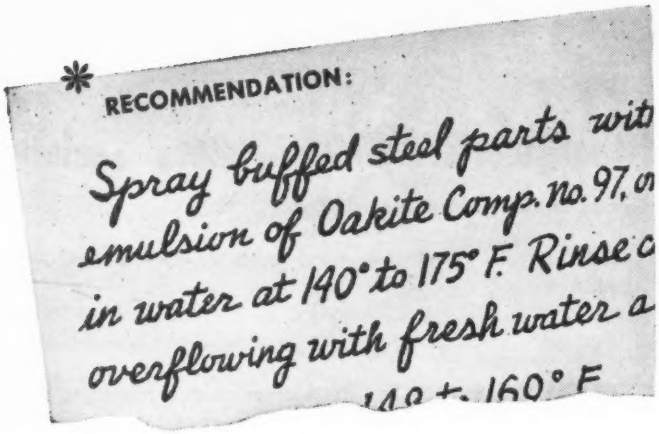
(*Continued on page 868*)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Ventilation

(*Continued from page 813*)

resisting paints of varying effectiveness and probably higher maintenance cost. Duct work handling fumes which can condense and drip should be made leak-proof at the joints. Steel should be of industrial rather than ventilating thickness. A large number of clean-out doors and drain connections in fans and duct work is desirable.

The hoods should be carefully designed to permit them or panels to be removed for access to the tanks.

After the ductwork has been designed, the fan should be selected. The cfm capacity is known. The pressure against which it must work can be calculated using the friction charts furnished by most fan manufacturers. The static pressure will be found to vary between a minimum of perhaps 1 inch of water to a maximum of about 2½ inches.

The fan may be of the radial-blade type, the forward-curved type, the backward-curved non-overloading type, or even of the axial flow type. It is beyond the scope of this paper to attempt to go into all of the study necessary to determine the type of fan to be chosen. One can depend on a fan supplier who has had experience to recommend the correct type.

Because of the wide variation in sizes of plating installations, the total amount of air exhausted can be anywhere from a few thousand to several hundred thousand cfm. Whatever the amount may be, it is withdrawn from the plating room and must be constantly replaced by air which eventually comes from outdoors. Therefore, unless the installation is very small and there is a sufficient internal supply of heat from non-ventilated processes, one has to provide a supply system for heated air which should be designed with the same care given to the exhaust system.

In conclusion, the important factors to remember in the design of a plating tank exhaust system are:

(1) Keep the ventilating system in mind when the plating equipment is being designed and laid out so that there will be space available to do a good job.

(2) Use adequate air quantities, but in order to economize, cover the tanks wherever possible and as much as possible.

(3) Keep the corrosive-gas handling systems separate from the non-corrosive systems in order to use as much standard steel duct work and fan equipment as is possible.

(4) Rather than trying to fit ducts to a fan that has already been selected, fit the fan to the ductwork after the duct system has been designed in order to permit economical and correct fan sizes and speeds.

(5) Consider the problem of make-up air when the design of the exhaust system has been completed and determine then whether and how make-up air will be heated and cleaned.

(*Additional information on this subject was presented in July and August issues, 1947, of* THE MONTHLY REVIEW, *pp. 825–829, 946–953, respectively.*)

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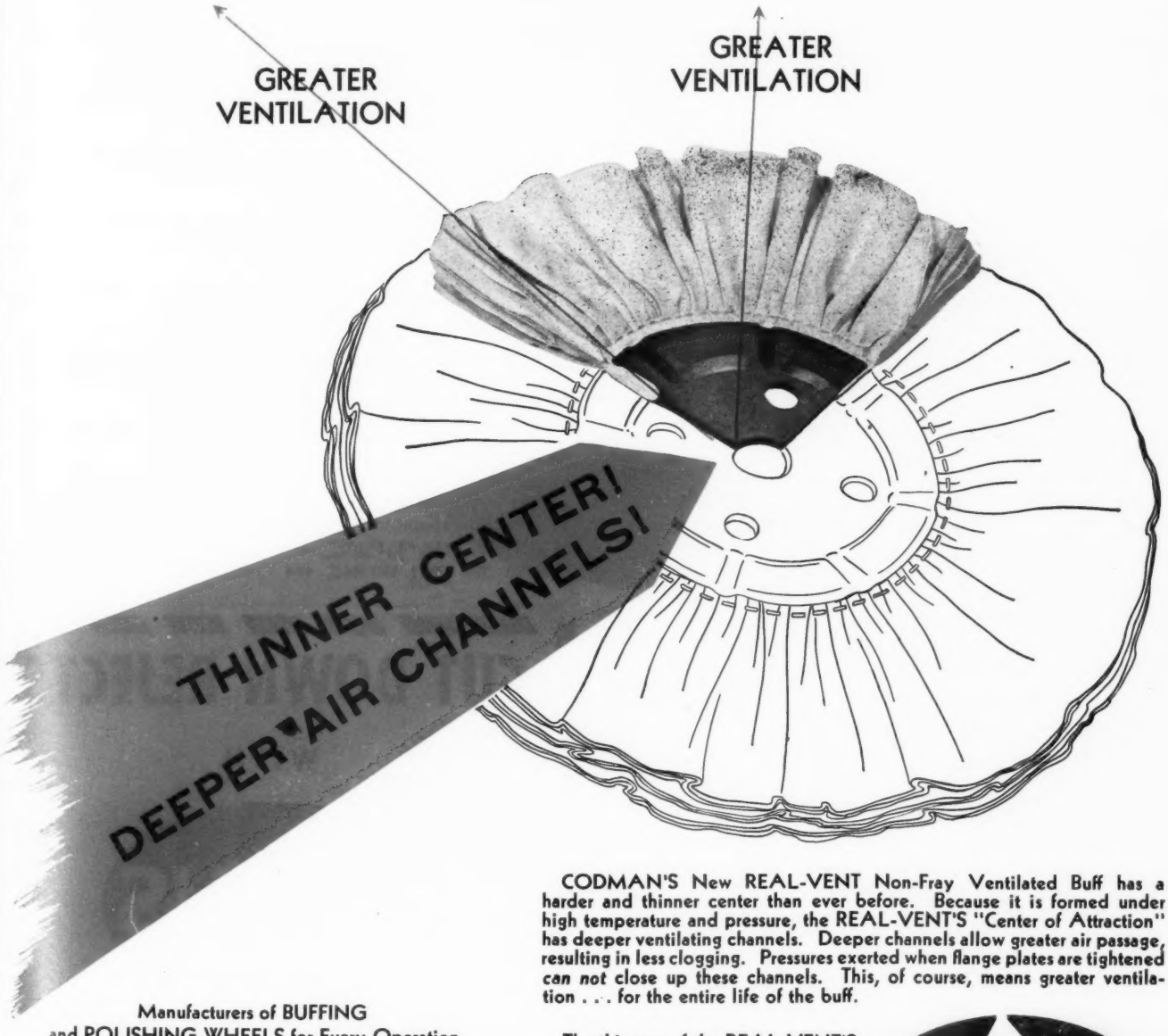
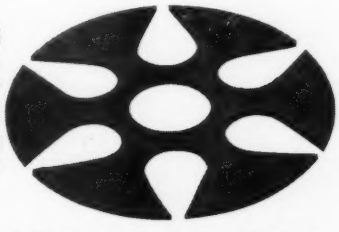


CODMAN'S New REAL-VENT Non-Fray Ventilated Buff has a harder and thinner center than ever before. Because it is formed under high temperature and pressure, the REAL-VENT'S "Center of Attraction" has deeper ventilating channels. Deeper channels allow greater air passage, resulting in less clogging. Pressures exerted when flange plates are tightened *can not* close up these channels. This, of course, means greater ventilation . . . for the entire life of the buff.

The thinness of the REAL-VENT'S center allows a much denser face. However, if a softer face is desired, ventilating spacer discs are available. These patented discs are unique in that a maximum air passage is gained no matter how they are arranged on the shaft.



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*The REAL-VENT Non-Fray Ventilated Buff is made under patent nos. 2,027,863; 2,094,650; 1,573,961; Re. 19,894; 2,140,208, other patents pending.

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Purification of a Nickel Plating Bath

(*Continued from page 817*)

cially on the upper surfaces of the articles. It was also noted that copper had deposited on the lead lining of the tank and on the anodes. Electrolysis for 12 hours onto a large iron cathode at low current density was effective in plating out a dark brown non-adherent slime which contained a high proportion of copper. Further dummy plating indicated that little benefit would apparently derive from continuance of this treatment; normal plating now produced excellent white, ductile nickel deposits.

Conclusions and Recommendations

While the abovementioned contamination of a nickel solution with zinc was useful in impressing the author with the virtues and advantages of low current density electrolysis as a means of removing metallic impurities, such a circumstance, it is to be hoped, is unlikely to recur with other platers. Excluding this contamination, it was demonstrated that the permanganate method of treating nickel plating solutions to remove organic contaminants is thoroughly sound and satisfactory, involving little trouble or expense.

The experiences with dummy plating detailed above are sufficient to lead to the conclusion that benefit must follow if all nickel baths are so treated regularly. Extreme cases in which continuous low current density electrolysis is advised are some bright nickel systems and baths which have been subject to complete neglect. Conservatively, it is recommended that Watts type baths be dummied every three months, or more frequently as required.

Much less frequently, following accumulation of organic impurities, it will be beneficial to purify nickel solutions by means of the following procedure:

(a) Maintain the solution temperature throughout the treatment at 50° to 60° C
(b) Agitate the solution
(c) Adjust the *p*H to 3 with sulfuric acid
(d) Add sufficient potassium permanganate solution to produce a persistent faint purple coloration (the color should remain after several hours' standing)
(e) Stop the agitation and allow the precipitate to settle overnight
(f) Filter the solution (discarding the bottom few inches of the bath may be called for, but is unnecessary if an effective filter is employed), thoroughly clean the tank, return the clean solution, and readjust the *p*H to standard
(g) Any purple coloration persisting in the filtered solution may be discharged by appropriate addition of 3 per cent hydrogen peroxide.

Benefit may derive from addition of a suitable form of activated carbon to the treated solution prior to filtration. Finely powdered activated carbon is, however, to be avoided as a general rule because of danger of introducing colloidal carbon.

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[2] Stocker, O. A., "Chemical and Electrochemical Methods for the Purification of Plating Solutions". Proc. Am. Electroplaters' Soc. **29**, 76 (1941).

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[4] Helbig, W. A., "Physical Removal of Impurities from Plating Solutions (by filtration)". Ibid. **29**, 65 (1941).

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